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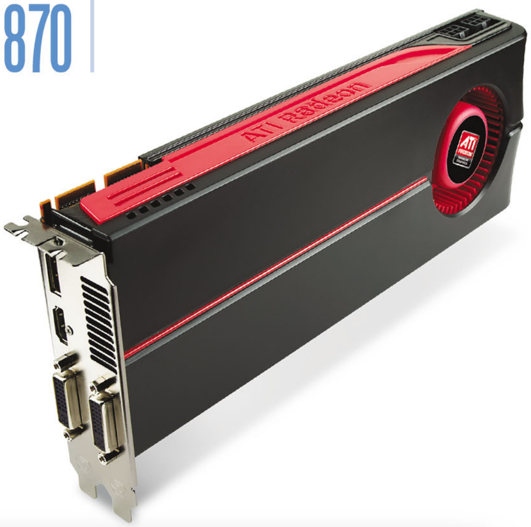

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Did you find the hidden *CPU* logo on our cover? Turn the page for the answer.

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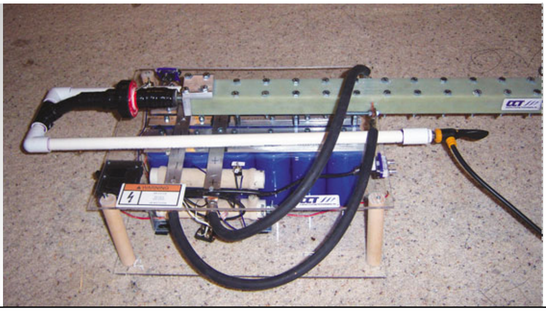

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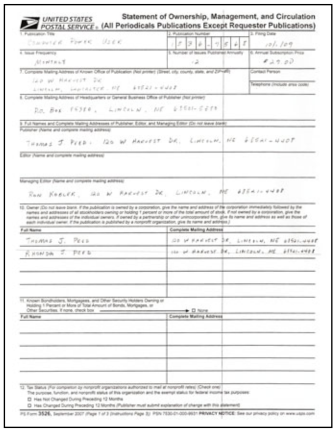
EDITOR'S NOTE

As I mentioned last month, *CPU* attended the Penny Arcade Expo in Seattle in September to hang out at the BYOC LAN, which this year became part of Intel's excellent LAN Fest series of LAN events. The LAN was great, and we were very pleased with the selection of mods people brought to the LAN as we judged the PAX edition of our "Mad Reader Mod" contest. You will find the winner of said contest displayed proudly on our cover, as well as plastered across pages 48 and 49; Brian "Boddaker" Carter is a flat-out modding genius. (If you dig cool mods—and who doesn't—make sure you stay tuned for our coverage of the Nvidia ION Case Mod Contest, co-sponsored by *CPU* and Modders-Inc.com; Carter's work will be there along with that of several other mod gods.)

Of course, while we were there, we got to take in the ambience of the larger PAX experience, as well, and let me tell you, there's nothing else like it. In the course of our work, we attend a great many trade shows and events, many of them gaming-related, and although most of them are cool, they invariably cater to the press and business types, which is understandable as that's what they're for. PAX, on the other hand, is for gamers by gamers, and it shows.

The exhibition area, which is huge, is just the beginning. Concerts, panel discussions, tournaments, massive free-play areas, and keynote talks are everywhere you turn, as are throngs of gamers. If you are a gamer (PC, console, tabletop, whatever) and have an opportunity to attend either the Seattle version or the new PAX East that will blow up in Boston next year, you owe it to yourself to give it a shot. Tell 'em Pat Summerall sent you.

Chris Trumble, Editor, Computer Power User



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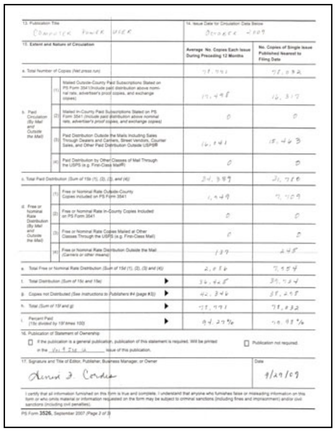

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What's Happening • Hardware

Compiled by Blaine Flamig

Fujifilm Brings 3D Digicam Goodness Stateside

Fujifilm USA brought its FinePix Real 3D system to the United States in late September. Described as the world's first "3D digital imaging system that captures realistic 3D still photographs and movies, providing 3D images that users can enjoy without special 3D glasses," the system includes the 10MP FinePix Real 3D W1 digicam ($599.95), Real 3D V1 Digital Viewer ($499.95; an 8-inch 3D/2D LCD panel), and FinePix 3D prints. Coinciding with the release, Nvidia CEO Jen-Hsun Huang declared the camera "Nvidia 3D Vision-Ready" for Nvidia's own 3D Vision glasses.

On the camcorder front, meanwhile, DXG (www.dxgusa.com) recently released its DXG-125V ($139.99) with native 720p support at 30fps, 128MB onboard memory, 2X digital zoom, integrated compass, HDMI port, and 2-inch LCD—all stuffed in a weatherproof, shock-protected, all-terrain body with rubber handgrip. ▲

"Making Supercomputing Personal"

Have a spare $7,995 handy? Then you can get in the "personal supercomputer" game with SGI's new Octane III, which "takes high-performance computing out of the data center and puts it at the deskside." The basic configuration gets you a lone Xeon 5500 node and GbE networking. Upgrades, however, can net you 80 cores and 960GB of RAM.

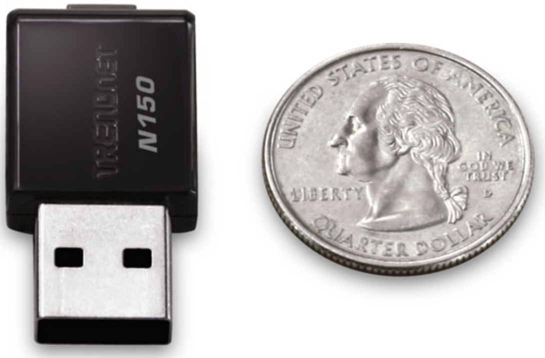
The Oak Ridge National Laboratory (www.ornl.gov), meanwhile, used Nvidia's recent GPU Technology conference to announce it will use Nvidia's upcoming "Fermi" GPU architecture, featuring 3 billion transistors and DirectX 11 support in its forthcoming supercomputer. Expectations are that the rig will be "10 times more powerful than today's fastest supercomputer."

At the other end of the processing scale, Computerworld's recent list of "The 11 Most Influential Microprocessors Of All Time" is a nice trip back in time—1971, in fact. That's when the list's chart-topping Intel 4-bit 4004 was released for Busicom desktop calculators. As *Computerworld* put it, "what microprocessor could be more influential than the first commercial model of all time?" ▲

Less Than A Second

That's how fast Phoenix Technologies (www.phoenix.com) says its new UEFI (Unified Extensible Firmware Interface)-based SecureCore Tiano BIOS can boot Windows. Yep, that's an industry best, the company says. In one of several videos shot at IDF that Phoenix Technologies has linked at its site, the company's Vice President and Chief Scientist Steve Jones demonstrated Tiano booting a tweaked Windows 7 installation on a Lenovo T400 laptop with an SDD in just 1.3 seconds. In less than 10 seconds, the Win7 Desktop displayed. If your eyes have enough quicks, look for the feature in upcoming Intel CULV-powered notebooks and possibly HyperSpace devices down the road. ▲

Wireless N Is Just A USB Port Away



We're unabashed fans of USB devices, so we're looking forward to plugging Trendnet's TEW-648UB into our aging lappy. Dubbed the "world's smallest Mini Wireless N USB adapter," the TEW-648UB is just 1.3 inches long and costs only $24.99. Unfortunately, it's also small in stature where wireless N speed is concerned, providing just 150Mbps single-stream quickness. Still, as Trendnet points out, that's six times the speed and three times the coverage of 802.11g. The adapter also supports one-touch Wi-Fi Protected Setup, which means pressing a button on a supported router and on the adapter is all it takes to connect.

Honest Technology's (www.honestech.com) USB-flavored Fotobox Plus ($79.95), meanwhile, slickly incorporates an SD card slot into a T-shaped USB device with integrated editing and display software. Transfer a card from digicam to Fotobox Plus, and you're displaying slideshows complete with special effects and background music. There's also output to DVD, SVCD, VCD, MPEG-1/2, AVI, WMV, and more. ▲

Long Live Us All

If you can hold on until 2040 or so, the great Ray Kurzweil believes nanotechnology will give you a shot at being close to immortal. Kurzweil recently stated in a *Computerworld* interview that current research is leading to a period when nanotechnology and biotechnology will combine to erase cancer, Alzheimer's, obesity, and diabetes. "In 30 or 40 years, we will overcome disease and aging. The nanobots will scout out organs and cells that need repairs and simply fix them. It will lead to profound extensions of our health and longevity," he says. By 2024, Kurzweil believes nanotech will add a year of life to life expectancies for each year that goes by. "Within 15 years, we will reverse this loss of remaining life expectancy. We will be adding more time than is going by." (Check out our own interview with Kurzweil from February 2002, page 108.) ▲

Archos 5 Does Internet Tablets Proud

As Internet tablets go, Archos looks likes it has hit the proverbial home run with its Android-based Archos 5 Internet Tablet ($379.99 to $499.99). Released in mid-September, this beauty packs the customary goodies we've come to expect from Archos devices (namely TV recording and scads of supported formats), plus a 4.8-inch touchscreen (800 x 400), full Web browser, 3D GPS, up to 500GB of storage, improved Wi-Fi (802.11n included), and Bluetooth (with support for 3G hookups via a mobile phone). Also new is Archos' AppsLib Store giving Archos 5 owners access to free and paid apps specifically designed for the device's screen. Additionally, the tablet bundles the Android-centric, European Mewbox music download service (roughly 4 million DRM-free tunes); access to thousands of Web TV and radio stations; the eBuddy IM app; Thinksfree for viewing Office files; and HD output via an optional DVR Station or HDMI Mini-Dock. ▲

Netgear, LG Do Consumer NAS

Netgear says its new Stora MS2110 NAS ($229.99) box, a sibling to the company's prosumer ReadyNAS lineup, is "designed for nontechnical users." To the end, the company is throwing in the MyStora.com Web site to let owners and their chosen participants remotely access files from Web-connected devices. Windows-, Mac-, and Linux-compatible, the box comes with a 1TB SATA drive and another bay, suitable for a RAID 1 config, as well as one USB port for external drives.

LG, meanwhile, recently turned loose two new N2R1 NAS boxes, including 1TB ($299) and 2TB ($399) models, both packing a DVD-RW drive; 802.11g; DLNA certification; and Windows, Mac, and Linux support. ▲

Compiled by Blaine Flamig

Broadband To Every Home Could Cost $350 Billion

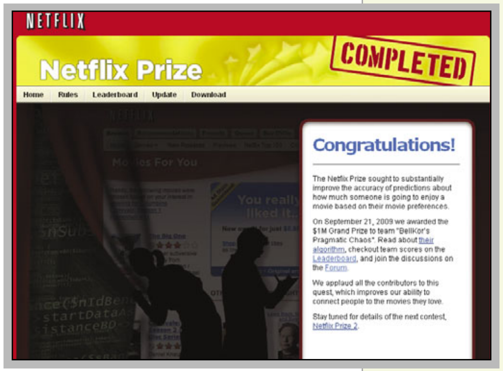
Outfitting the entire United States with broadband access could cost $20 to $350+ billion, the FCC detailed in a late-September report. The $350 billion mark represents the best access speeds possible. Even the low end of the estimate easily surpasses the $7.2 billion the Obama administration tucked aside in the economic stimulus package to update broadband infrastructure, meaning the private sector and taxpayers will likely pick up the slack. The report comes ahead of a long-range national broadband plan the FCC is expected to present to Congress in February. Although the report states that roughly two-thirds of American adults have broadband in the home, at least 3 million to 6 million homes lack any high-speed access. ▲

It's 11 p.m. Somewhere . . .

. . . and if you're online, you're far from alone. A recent study from Arbor Networks (www.arbornetworks.com) found that the peak U.S. Internet usage time over 10 weekdays in July was 11 p.m. EST. Arguably more surprising, Arbor Networks found that usage remained "relatively high until 3 a.m." North American Internet traffic volumes at 6 a.m. were at "50% of their daily peaks," with traffic climbing to a "local maxima at 4 p.m." In addition to gaming accounting for late-night traffic spikes, Arbor Networks' readers theorized that "Americans watch more video and related adult entertainment late at night" than those in Europe, where Web traffic peaks around 9 p.m. Further, readers suggested that "in general, Europeans use the Internet less at night, have better social interactions, eat better food, and generally live better lives." ▲

Netflix Ponies Up Another $1 Million

How productive was the $1 million challenge Netflix started in October 2006 and finally concluded in September? Enough so it put up another $1 million for a new contest. Reportedly, 40,000-plus teams from 186 countries participated in the contest that challenged contestants to improve Netflix's movie recommendation system by at least 10% for customers who regularly rate movies. (The current contest calls for improving ratings for those who rarely or never rate movies.) BellKor's Pragmatic Chaos, a group of three teams that previously competed separately, tied The Ensemble 30-member group of combined teams with a 10.6% improvement but submitted its offering about 20 minutes before the deadline, narrowly beating The Ensemble's last-minute entry. ▲



Congratulations!

The Netflix Prize sought to substantially improve the accuracy of predictions about how much someone is going to enjoy a movie based on their movie preferences.

On September 21, 2009 we awarded the $1M Grand Prize to team "BellKor's Pragmatic Chaos". Read about their algorithm, checkout team scores on the Leaderboard, and join the discussions on the Forum.

We applaud all the contributors to this quest, which improves our ability to connect people to the movies they love.

Stay tuned for details of the next contest, Netflix Prize 2.

SITE SEEING

Examiner.com Expands Its Hyperlocal Reach

The online "hyperlocal" scene became more interesting in September when Examiner.com, which pays contributors to cover a wide range of topics, bought citizen journalism site NowPublic.com. Examiner.com CEO Rick Blair stated that despite constant discussions concerning whether hyperlocal content can be "scalable, sustainable, or profitable as a business entity," the NowPublic acquisition gives Examiner.com the "technology to further engage our community of over 17 million unique visitors per month and distribute our stories in new and innovative ways." Examiner.com says its traffic has leapt more than 200% since its launch in April 2008. The site touts 15,000 active "Examiners," or expert writers, in 109 cities but plans to reach 30,000 by year's end. ▲

A Star Wars Collection

The "My Stars Wars Collection" section of Joshua Budich's Web site (www.joshuabudich.com/SWCollection) is a thing of beauty, but for "Star Wars" fanatics, the site is downright shrine-worthy. Recently named a 2009 Webby Award and People's Voice award winner, the site is essentially nothing but 564 thumbnails of "Star Wars" figures from Budich's collection. Still, there's something oddly beautiful and mesmerizing about Budich's simplistic design, which sorts the figures by Series, Assortment, Movie, or Year. If you're asking why the effort for "stupid pieces of plastic," Budich explains that the answer is a "multilayered, deeply psychological one requiring some bit of introspection and, in the end, probably a bit of therapy as well." Ultimately, "Being a collector defines who I am, and the process has been a memorable one not just for me, but also for my loved ones," Budich writes. Good enough for us. ▲

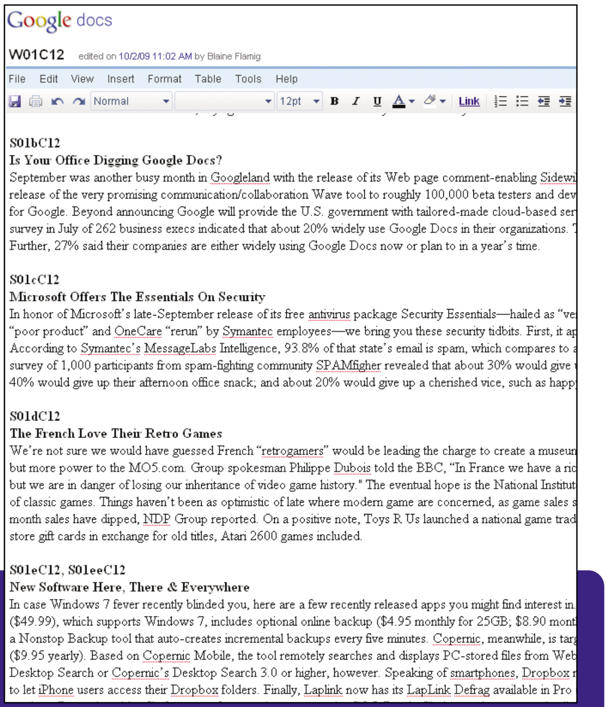
Compiled by Blaine Flamig

"Huge & Bloated"

That was the tag Linus Torvalds slapped on the Linux kernel during a roundtable discussion at LinuxCon recently. Novell's James Bottomley reportedly cited an Intel study that indicates Linux's performance has dipped about 2% with each kernel release the last 10 releases. Asked if that's a problem, Torvalds stated, "The kernel is huge and bloated, and our icache footprint is scary. I mean, there is no question about that. And whenever we add a new feature, it only gets worse." Also at LinuxCon, various bigwigs reportedly agreed that despite Linux not making huge inroads on the desktop, it's doing just fine elsewhere, including in the mobile space. IBM's Bob Sutor reportedly said, "If the Linux desktop gets into the double digits across a broad range of people, it's probably time to claim victory." ▲

Is Your Office Digging Google Docs?

September was another busy month in Googleland with the release of its Web page comment-enabling Sidewiki feature contained in the Google Toolbar and release of the very promising communication/collaboration Wave tool to roughly 100,000 beta testers and developers. There was also good news in the cloud for Google. Beyond announcing Google will provide the U.S. government with tailor-made cloud-based services hosted in Google data centers, an IDC survey in July of 262 corporate employees indicated that about 20% widely use Google Docs in their organizations. That's up from roughly 6% in December 2007. Further, 27% said their companies are either widely using Google Docs now or plan to in a year's time. ▲



W01C12 edited on 10/2/09 11:02 AM by Blaine Flamig

S01bC12
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S01cC12
Microsoft Offers The Essentials On Security
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According to Symantec's MessageLabs Intelligence, 93.8% of that state's email is spam, which compares to
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40% would give up their afternoon office snack; and about 20% would give up a cherished vice, such as happ

S01dC12
The French Love Their Retro Games
We're not sure we would have guessed French "retrogamers" would be leading the charge to create a museu
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but we are in danger of losing our inheritance of video game history." The eventual hope is the National Institut
of classic games. Things haven't been as optimistic of late where modern game are concerned, as game sales
month sales have dipped, NDP Group reported. On a positive note, Toys R Us launched a national game trad
store gift cards in exchange for old titles, Atari 2600 games included.

S01eC12, S01eeC12
New Software Here, There & Everywhere
In case Windows 7 fever recently blinded you, here are a few recently released apps you might find interest in.
($49.99), which supports Windows 7, includes optional online backup ($4.95 monthly for 25GB; $8.90 mont
a Nonstop Backup tool that auto-creates incremental backups every five minutes. Copernic, meanwhile, is targ
($9.95 yearly). Based on Copernic Mobile, the tool remotely searches and displays PC-stored files from Web
Desktop Search or Copernic's Desktop Search 3.0 or higher, however. Speaking of smartphones, Dropbox
to let iPhone users access their Dropbox folders. Finally, Laplink now has its LapLink Defrag available in Pro

Staying On The Open-Source Front . . .

In September, Microsoft cut a $1 million check to initially fund the nonprofit CodePlex Foundation (www.codeplex.org), whose mission is to enable "the exchange of code and understanding among software companies and open-source communities." In a release, the foundation, which includes four Microsoft employees on a six-member board of directors and six employees on a 12-member board of advisors, stated that CodePlex will "complement existing open-source foundations and organizations, providing a forum in which shared understanding can be established by a broad group of participants, both software companies and open-source communities." Soon after, however, attorney and ConsortiumInfo.org founder Andy Updegrove blogged that among other things, the foundation's formation documents contained "gotchas." "Some of these can be easily changed . . . but others (such as the decision not to form CodePlex as a membership organization) are so fundamental that I expect that Microsoft doesn't intend for them to change," he wrote. CodePlex Interim President Sam Ramji of Microsoft welcomed the criticism, saying the foundation's first 100 days are essentially a beta. ▲

The French Love Their Retro Games

We're not sure we would have guessed French "retrogamers" would be leading the charge to create a museum dedicated to old-school arcade video games, but more power to MO5.com. Group spokesman Philippe Dubois told the BBC, "In France we have a rich culture of arts, painting, literature, and cinema, but we are in danger of losing our inheritance of videogame history." The eventual hope is the National Institute of Digital Sciences will house working versions of classic games.

Things haven't been as optimistic of late where modern games are concerned, as game sales slid 16% in August, marking the sixth straight month sales have dipped, NDP Group reported. On a positive note, Toys "R" Us launched a national game trade-in program in mid-September that gives traders store gift cards in exchange for old titles, Atari 2600 games included. ▲

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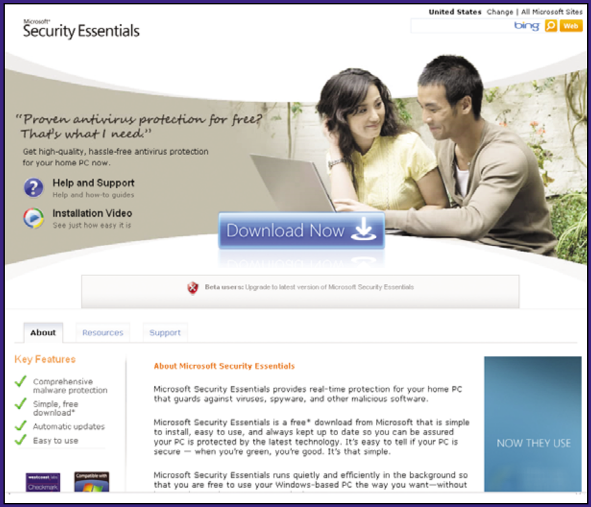
Microsoft Offers The Essentials On Security

In honor of Microsoft's late-September release of its free antivirus package Security Essentials—hailed as "very good" by independent tester AV-Test.org to a "poor product" and "OneCare rerun" by Symantec employees—we bring you these security tidbits. First, it appears spammers have a penchant for potatoes. According to Symantec's MessageLabs Intelligence, 93.8% of Idaho's email is spam, which compares to a global average of 86.4%. Elsewhere, a recent Spamfighter survey of 1,000 participants revealed that about 30% would give up their morning coffee to be rid of spam; about 40% would give up their afternoon office snack; and about 20% would give up a cherished vice, such as happy hour drinks. Wait a minute . . . ▲



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Job Of The Month

Not everything online is produced by an automated nest of algorithms. In fact, if you pop the hood on some digital projects, there are human hamsters running on belts, fine-tuning such minute details as how to tag and classify images. Who, after all, creates summaries of articles for Web sites or extracts hard numerical and text data from images? These are the types of indexing and searching jobs that still require manual work. Amazon's "Mechanical Turk" is a "scalable workforce" where any of us can pick up this kind of piecemeal work from contractors and get paid on the spot. Referred to as HITs (Human Intelligence Tasks), they usually involve low-level grunt work, such as finding the URL and contact information for a list of company Web sites or entering data about specific trees. There are HIT listings for tasks ranging from finding and categorizing educational blogs to tagging fashion magazine covers. The good news about Mechanical Turk is that no specific experience is required, and there are nearly 90,000 HITs available at any given time. The bad news is the pay, which usually comes to pennies per task. Hamsters, even human ones, have to expect to work cheap.

www.mturk.com/mturk/welcome

More Screens, More Media

TV executives need not fear the Internet. According to Nielsen research, Americans' overall media consumption just keeps going up, up, up as technology adds more screens to watch.

Monthly Time Spent Per User (Hours:Minutes)

Activity	2Q '09	2Q '08	Difference Year Over Year (% Diff.)
Watching TV In The Home	141:03	139:00	2:02 (1.5%)
Watching Timeshifted TV (DVRs)	7:16	6:05	1:11 (19.5%)
Using The Internet	26:15	26:29	-0:14 (-0.9%)
Watching Video On Internet	3:11	2:12	0:59 (45.5%)
Video On Mobile Phone	3:15	3:37	-0:22 (-10.0%)

Source: Nielsen

Santa On A Shoestring

The digital economy has its fingers crossed this holiday season about the impact of the Great Recession on gift giving and overall spending. It could be a tough season, according to a survey by Harris Interactive on behalf of ING Direct. Only 54% of us plan to spend more than $300 on gifts this season, down 10% from last year. Grandma and Grandpa, usually the most generous givers of the season, are trying to rebuild those market-battered 401Ks this year, and so only 61% of those 55 or older will spend more than $300, compared to 71% last year.

The Internet Is Recession Therapy

Nervous about the economic crisis and lingering unemployment? Among those who consult the Internet to keep up with financial and economic news, 74% say they also use the Web as a way to relax and get their minds off of the recession. The Pew Internet & American Life Project found that most of us watch online video and listen to music to get our minds off of economic woes.

Raw Numbers

SOCIAL MEDIA EDITION

19%

Internet users who have posted political content or used social networks to engage issues

Pew Internet & American Life Project

81 Million

Americans who visited a government Web site, July 2008

(comScore)

1.27 Million

Followers of The White House's Twitter page

Twitter.com/whitehouse

72%

Percent of senior corporate executives who visit social media sites weekly

Russell Herder

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Intel® Core™2 Quad Processor Q9550	$764
Intel® Core™2 Quad Processor Q9400	$729
Intel® Core™2 Quad Processor Q8400	$709
Intel® Core™2 Quad Processor Q8200	$694
Intel® Core™2 Duo Processor E8600	$814
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Intel® Core™2 Duo Processor E8400	$714
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Intel® Core™2 Quad Processor Q9550	$904
Intel® Core™2 Quad Processor Q9400	$874
Intel® Core™2 Quad Processor Q8400	$854
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- Genuine Windows® Vista™ Home Premium
- High Definition Surround 3D Premium Sound

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Intel® Core™ i7-920 Processor	$999

$999

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The Saint

by Alex St. John

Happy 15th Anniversary & 10th Generation To DirectX!

I know, I know, it's called DirectX 11, but that's only because I canceled the release of DirectX 4 in 1996 due to a release scheduling problem.

There are inevitable comparisons between Direct3D and OpenGL that people make every time there is a major DirectX release. An imaginary battle between Direct3D and OpenGL has been taking place in the minds of game developers and the media ever since John Carmack gave Microsoft the Doom source code and let us port it to Windows using DirectX 1.0 to become the first DirectX game and best-selling Windows 95 application. At the time, DirectX 1.0 was composed of DirectDraw, a 2D drawing API; DirectInput, a joystick API; and DirectSound. Carmack was no fan of Microsoft to begin with (Doom was developed on NextStep) but was always willing to support big companies in doing the right thing for gaming even if he had a distaste for their cumbersome hegemony.

> The restoration of DirectDraw capabilities to DirectX will enable a much more powerful and practical blending of 2D UI and interactivity with 3D objects and video.

The problems started when those of us working on creating the early generations of DirectX saw that the future of gaming was 3D and wanted to ensure Microsoft's leadership and dominance in that space. In those days, Microsoft had two competing OS groups: the Windows 95 team, focused on consumer OSes, and the Windows NT team, which was focused on enterprise OSes. The DirectX team was located in the Windows 95 group. Although I had a background in graphics and 3D, I initially had no idea how to lay the foundations for a Windows 3D gaming API in the absence of any market context whatsoever. Microsoft had several famous 3D luminaries working for Nathan Myhrvold; I consulted with them, only to conclude that they really had no idea, either. They were working on a whacky 3D hardware architecture called "Talisman" that they hoped to impose on graphics chip manufacturers as the standard for Windows 3D. The Windows NT group had secured a license to OpenGL from SGI with the intention of trying to put Unix-based workstations out of business by making Windows NT a superior CAD and media-authoring platform.

OpenGL seemed to me like a fine starting point, but there were two problems. The first was that the NT group had no interest in gaming, and as they tended to be fairly competitive with the Windows 95 team, they wouldn't share their access to OpenGL with us. Second, OpenGL was an API and did not specify a hardware driver architecture or a path for consumer hardware manufacturers to hardware-accelerate it. No matter what 3D API we wanted developers to use, we were going to have to invent a 3D driver model for Windows 95. The reason DirectX was called "Direct" was because we saw it as a driver-level API that enabled game developers to talk to a thin API layer that mapped directly to hardware capabilities. The idea was that the only way to give game developers the speed and control they needed to make great Windows games was to push the OS out of the way and place as little Microsoft "goo" between the developer and the metal as possible. We took the same approach with Direct3D, focusing on a very low-level hardware API and letting the game developers figure out how to build their game engines with minimal OS interference.

I was given the mission of finding a company for Microsoft to buy that had the right "vision" for consumer 3D hardware acceleration. Among the contenders were Criterion (later purchased by EA), Epic (Unreal), and RenderMorphics. We chose RenderMorphics because we felt they had the best vision for how to create a 3D driver model for gaming that would foster a fast competitive market for consumer 3D hardware.

The trouble and confusion began when the Microsoft OpenGL team felt threatened by the advent of another 3D API team working to create a consumer gaming API. They had also been working on a Windows driver architecture for 3D hardware acceleration, intended mostly for CAD-like applications. The huge success associated with the first DirectX games had made gaming "cool" at Microsoft, and suddenly everybody wanted in on the party. The OpenGL team objected strenuously to the acquisition of RenderMorphics on the grounds that they were better qualified to define the driver architecture for 3D on Windows and besides, Windows 95 was a dead end; NT was supposed to become the next mainstream OS architecture.

The OpenGL team lost this internal battle, and shortly thereafter a key member of the NT team who had been working on its 3D driver architecture resigned and joined . . . id Software. Shortly thereafter, John Carmack became a vocal and ardent OpenGL supporter. Another former Microsoft employee associated with the OpenGL group orchestrated an "open letter" to Microsoft, purportedly from the game industry, demanding that developers be given a choice between Direct3D and OpenGL as though they were equivalent technologies. Both of these events staged a media circus that appeared to pit Direct3D, a hardware driver layer, directly against OpenGL, a high-level 3D API. Direct3D was not intended to compete with OpenGL and was in fact designed to be a driver layer that could support OpenGL applications, but no amount of explaining this seemed to quell the debate. The battle raged on even after Microsoft had an intern write a Direct3D wrapper for id Software's QuakeGL and demonstrated it running faster on Direct3D than on the same hardware running an OpenGL driver.

The press had a fun David vs. Goliath story to run with, the game developers enjoyed the idea that they were somehow resisting The Man (even as they migrated to Windows game development), and the OpenGL team at Microsoft worked the politics of the situation to try to regain control of Microsoft's 3D strategy. Eventually, even Microsoft forgot that Direct3D was not intended to compete with OpenGL. By the time DirectX 8 rolled around, members of the former OpenGL team had migrated to Direct3D where they re-engineered it in OpenGL's image.

So, if John Carmack was right about OpenGL, why doesn't anybody else use it anymore? The answer is simple. Carmack was right, but it didn't matter because 3D was no use for real-time gaming without hardware and drivers. Direct3D won precisely because it was a driver architecture complete with certified Windows compatibility testing, developer support, porting labs, and extensive documentation, and because it was integrated with the other DirectX APIs, which were less famous but just as essential to making a game. Microsoft built Direct3D into a gaming API by starting with a foundation and building upward, whereas OpenGL started as a house on stilts and tried to build a foundation later, only to find that Microsoft's OS driver architecture is something only Microsoft can own and define.

One of the "petty" omissions from DirectX 8.0 was DirectDraw, the original 2D drawing API that made 2D games like Diablo possible in Windows. The need to integrate with DirectDraw (and DirectSound) drivers was one of the huge features of Direct3D that invalidated much of the OpenGL team's rantings about the inferiority of Direct3D as a high-level 3D API. An unfortunate consequence of the "openGL-ification" of Direct3D was the depreciation of the DirectDraw API as "obsolete," despite its incredible power and ease of development. This October's release of Windows 7 and DirectX 11 corresponds to the 15th anniversary of DirectX when Eric Engstrom, Craig Eisler, and I wrote the first strategy documents for the new API.

Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades Of The Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is president and CEO of WildTangent Inc., a technology company devoted to delivering CD-ROM quality entertainment content over the Web.

The DirectX 11 feature most people will hear about is Tessellation, which can best be thought of as a form of geometry compression. DirectX 11 also features new texture compression algorithms. Investment in hardware compression of 3D assets is a double win for consumers because it is a very clever way to both increase visual quality and increase effective bandwidth simultaneously; 50% data compression is equivalent to a 200% increase in bus bandwidth, or two times the visual quality.

On this DirectAnniversary, however, I can honestly say that my favorite new feature of DirectX 11 is the new Direct2D API (msdn.microsoft.com/en-us/library/dd370990(VS.85).aspx). The restoration of DirectDraw capabilities to DirectX will enable a much more powerful and practical blending of 2D UI and interactivity with 3D objects and video. I suspect that Microsoft may have rediscovered the need for DirectDraw in trying to do a better job of hardware-accelerating Windows 7's GUI, which is very smooth and responsive as a consequence. ▲

Send your feedback to
thesaint@cpumag.com

DREAM HARDWARE

It may be trendy these days to buy only what you need and to get good value for your money. Luckily, in dreams, blatant excess never goes out of style.

by Marty Sems

Weisscam HS-2

Although it's overkill for anyone still making YouTube videos of cats playing the piano, we're fairly sure that ultra-slow-motion 2K video and a spot on the NFL sidelines would make for a hell of a Sunday. Weisscam's stunning HS-2 (www.weisscam.info) can shoot at up to 1,500fps at 2,048 x 1,536, not to mention 4,000fps in 720p and 2,000fps in 1080p. This Super 35mm CMOS cam gives you HD and RAW data streams, 10-bit color, and complete control over frame rate and shutter speed. In the States, take your business to distributor ZGC (www.zgc.com). Your $217,500 check will nab you an HS-2 fully loaded with an OLED viewfinder, more than 2TB of HD SDI dual-link storage, software, and more. Me-yow. ▲

Cabasse La Sphère

Running rings around many exotic speakers is the French creation La Sphère. It's made by Cabasse (www.cabasse.com) and distributed in the United States by St. John Group (www.stjohngroup.com). This 220-pound, coaxial 4-way invader taps into your subliminal suggestion potential with sounds you can't even hear, from 20Hz bass all the way up to 25,000Hz. In our tests, subjects were 37% more likely to consume wine and/or cheese after a listen and tended to grumble about the shortage of Renault dealerships in their areas. Besides the 1.1-inch polyether tweeter burrowing into your brainpan, La Sphère has a 4-inch P2C midrange, an 8-inch tri-axial driver, an 8-inch Duocell low-to-mid, and a colossal 22-inch woofer. Budget $182,600 for the speakers, amps (eight in all), and in-home setup, or Cabasse will taunt you a second time. ▲

Eclipse

Photo: EPA.

For childhood bathtub fantasies writ large, you have to hand it to *nouveau riche* Russian billionaire Roman Abramovich. We'd certainly love to see the original cocktail napkin with his personal specifications for this, what will be the largest yacht in the world. German shipwrights Blohm & Voss (www.blohmvossyachts.com) must have shrugged philosophically and got straight to work on the missile-proofing, the dual helicopter platforms, the antiphotography lasers, the armored bedroom, and, of course, the escape sub. We can only imagine the Sea Wolf arcade game noises its designers must have made at their drawing boards in the wee hours of the night. Said to be at least 557 feet long, the Eclipse is rumored to have blacked out a nearly $1.2 billion crescent of the oil magnate's bank account. ▲

The Corsair Dream PC

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do it right,
you have to
do it yourself.

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AM3 Motherboard Bonanza

A Host Of Dragons, Clocked & Compared

With the introduction of its Socket AM3-compatible Athlon II and Phenom II desktop processors, AMD has finally begun offering support for DDR3 memory technology. Like the move from standard DDR to DDR2 memory for AMD a few years back, the coupling of DDR3 to the company's current line of processors doesn't result in massive performance increases, but it does lay the foundation for official support of higher-speed, lower-power DDR3. And because AMD's processors feature integrated memory controllers, many of AMD's motherboard partners introduced revamped Socket AM3 offerings based on the tried-and-true AMD 7-Series of chipsets, but with the necessary DDR3 memory slots.

A week prior to launching the Phenom II X4 965 Black Edition CPU, though, AMD launched a new addition to the 7-Series, dubbed the 785G. As you might expect, based on its name, the 785G features an integrated graphics processor, namely the ATI Radeon HD 4200. What makes the 785G stand out from AMD's other integrated graphics offerings is that the GPU supports DirectX 10.1 and HDMI 1.3. It's also outfitted with AMD's second-gen UVD 2 (unified video decoder engine), which lets the GPU assist the CPU in decoding video during playback.

Now that AMD's desktop platform is replete with a new socket and processors to match, we thought it was a good time to revisit the platform to see what the latest batch of motherboards has to offer. We've rounded up a sampling of brand-new Socket AM3 motherboards based on the AMD 785G chipset, in addition to a few enthusiast offerings built around the 790FX and 770 chipsets. Read on for the full scoop.

How We Tested

To gauge the performance of the socket AM3-based motherboards featured in this roundup, we equipped our Phenom II X4 955 Black Edition-powered testbed with a host of complimentary high-end components. We started with 4GB of Corsair TW3X4G1333C9DHX DDR3 RAM, a GeForce GTX 280 graphics card (where applicable), and a 10,000rpm Western Digital Raptor 150GB HDD. We installed Windows Vista Ultimate SP2 on the hard drive, along with the latest drivers available for each motherboard and graphics card or IGP.

Prior to testing, we manually set each board's HyperTransport base clock frequency and dialed in the memory timings via each board's system BIOS. Some motherboard manufacturers have been known to aggressively clock their boards even when configured at default settings, so manually setting these options in the BIOS levels the playing field somewhat and ensures each motherboard operates with similar settings.

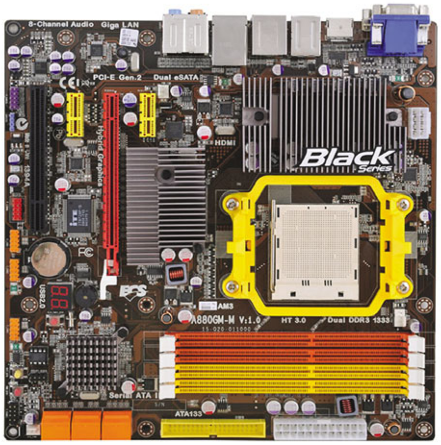
Prices listed were taken from Newegg .com at the time of this writing.

ECS Black Series A785GM-M

As its model name suggests, the ECS Black Series A785GM-M is a microATX motherboard based on the AMD 785G chipset. Despite its relatively affordable price and smaller form factor, the A785GM-M has a considerable number of features, especially in light of competing offerings.

The ECS Black Series A785GM-M is built on a dark-colored PCB, with orange, yellow, and black accents. The layout of the board is generally very good, with all of its various expansion headers and connectors neatly situated around the edges of the PCB. And even though it sports a microATX form factor, the A785GM-M doesn't seem cramped at all.

Standout features on the A785GM-M include onboard power, reset, and clear CMOS switches, an LED POST code



Black Series A785GM-M
$87.99
ECS
www.ecsusa.com
● ● ●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ● ● ◖ 2.5 = ABSOLUTELY AVERAGE | ● ● ● ● ● 5 = ABSOLUTELY PERFECT

error reporter and support for 140W proces-sors, such as the Phenom II X4 965, which draws more power than AMD's previous flagship Phenom. The A785GM-M is also outfitted with a trio of heavy-duty aluminum heatsinks on its VRM, northbridge, and southbridge, which did a fine job throughout testing.

The A785GM-M's BIOS is well-appointed, considering the affordable nature of the product, but it does lack some features in comparison to higher-end products such as Asus' Crosshair III Formula or MSI's 790FX-GD70. I/O in the backplane consists of VGA, DVI, and HDMI outputs; six USB ports; two eSATA ports; a FireWire port; a Gigabit Ethernet port; and six various audio inputs and outputs, including S/PDIF.

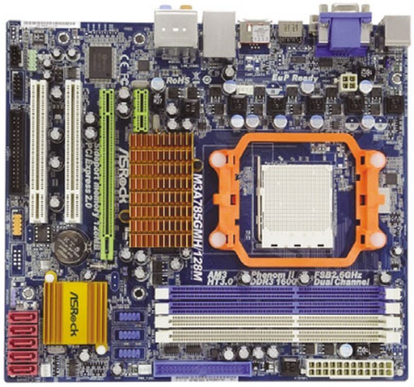
ECS isn't known for products that cater to high-end power users, but this relatively affordable microATX offering has a number of features that make it interesting to prospective AMD-based system builders on budget.

ASRock M3A785GMH/128M

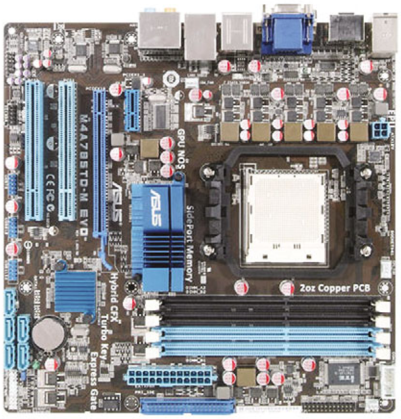
The ASRock M3A785GMH/128M details all of its main features in one fell swoop, provided you can decipher its name. It is, of course, based on AMD's Socket AM3, built around the 785G chipset, and outfitted with 128MB of side-port memory, which is dedicated RAM linked to the IGP to enhance overall performance.

The ASRock M3A785GMH/128M is a decidedly no-frills product. Other than the features inherent to the AMD 785G/SB710 chipset combination, the board doesn't have much else to offer. The layout is decent but far from perfect: There is a trio of USB headers crammed next to the DIMM slots, and the supplemental 4-pin ATX 12V connector is placed a couple of inches in from the top edge of the board, between the CPU socket and I/O backplane—not an ideal location.

The ASRock M3A785GMH/128M comes with a basic bundle of accessories, and the aforementioned I/O backplane is roughly similar to ECS' board, with VGA, DVI, and HDMI outputs; eSATA and GigE ports; and a handful of USB ports.



M3A785GMH/128M
$84.99
ASRock
www.asrock.com
● ● ◖



M4A785TD-M EVO
$89.99
Asus
usa.asus.com
● ● ● ◖

The M3A785GMH/128M's BIOS is relatively bland, but it does give users the ability to easily overclock the CPU and IGP.

Although it's priced similarly to the ECS- and Asus-branded microATX motherboards represented in this article, the ASRock M3A785GMH/128M doesn't offer nearly as many features as its competition. The board performs well and was perfectly stable, but there's no compelling reason to opt for the M3A785GMH/128M when the Asus M4A785TD-M EVO and ECS Black Series A785GM-M are available for roughly the same price and have more features.

Asus M4A785TD-M EVO

At first glance, the Asus M4A785TD-M EVO looks quite sleek, with its black PCB and light blue accents. The dark blue northbridge heatsink design is interesting to see, as well, with its swooping, curved fins and angular design. The southbridge gets treated to a small blue heatsink, too, but it's just a plain-looking square with an array of low-profile fins.

Overall, Asus did a good job with the M4A785TD-M EVO's layout. The CPU socket is free of obstructions, and there is plenty of room for an oversized CPU cooler. The memory slots are placed somewhat close to the CPU socket, but this won't likely be an issue unless you install DIMMs with taller-than-average heatsinks in all four memory slots. If you only need to use the board's two light blue DIMM slots for a dual-channel setup, you shouldn't have to worry about colliding heatsinks.

The M4A785TD-M EVO uses a 4-pin 12V power connector that's situated at the top corner of the board near the rear I/O, right above the VRM area. Its location is very good and shouldn't present any cable routing issues. The board's expansion slots are free from obstruction, as well, as Asus mounted all of the various connectors and ports out of the way of the top three slots. Even with a dual-slot full-length video card in the PCI-E x16 slot, all of the board's connectors are still accessible. Five internal SATA connectors are located in a tight cluster at the bottom corner of the PCB and oriented conventionally so the cables connect perpendicular to the PCB. In addition, all of the board's USB and FireWire headers are located along the bottom edge of the board, which should work well in most cases.

The only minor issue to point out in regard to the board's layout is the positioning of the front-panel audio connector. It is located at the bottom-left corner of the board—basically the furthest position it could be relative to the location of the front audio panel on most cases.

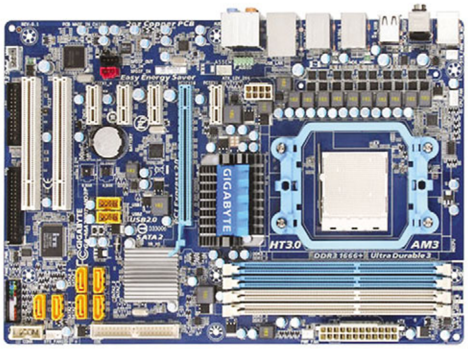
The BIOS on the M4A785TD-M EVO is quite complete and should offer tweakers enough options to keep them satiated while overclocking, but the bundle leaves a

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ● ● ◖ 2.5 = ABSOLUTELY AVERAGE | ● ● ● ● ● 5 = ABSOLUTELY PERFECT

little something to be desired. Save for a users manual, drivers, I/O shield, and a couple of SATA and IDE cables, nothing else comes with the board.

Ultimately, the M4A785TD-M EVO is a solid option, though, and worthy of consideration if a microATX, socket AM3 board is in your future.

Gigabyte MA770T-UD3P



MA770T-UD3P
$79.99
Gigabyte
www.gigabyte.us
●●●●

The Gigabyte MA770T-UD3P is based on the mainstream AMD 770 series chipset. It sports an SB710 southbridge and official support for DDR3 memory speeds in excess of 1,666MHz. The "UD3" in the product name denotes that this board is part of Gigabyte's Ultra Durable 3 family of products. As such, it's equipped with solid Japanese capacitors, 2-ounce copper layers in the PCB to aid with power efficiency and cooling, and ferrite core chokes. Ferrite core chokes are more energy-efficient and are better at reducing EM interference than more common, less expensive iron core chokes.

The MA770T-UD3P also supports Gigabyte's dynamic Easy Energy Saver technology, which throttles the number of active power phases on the motherboard based on the workload, and includes Gigabyte's DualBIOS feature. The board is compatible with AMD's 140W TDP processors, such as the recently released Phenom II X4 965 Black Edition. The board's slot configuration consists of a single PCI-E x16 slot, four PCI-E x1 slots, and dual PCI slots. There are small aluminum coolers on the northbridge and southbridge, and all of the various connectors and headers are color-coded and labeled for easy installation.

Overall, the layout of the Gigabyte MA770T-UD3P is good, save for the placement of a few connectors. The IDE and connectors are placed at the bottom edge of the board, which can make it difficult to run cables in some mid- and full-tower cases. On the other hand, you probably won't use this connector in a new build, so we won't ding Gigabyte much for their placement. The supplemental 12V ATX power connector, however, which everyone must use, is situated between the 770 chip and I/O backplane—not ideal.

The MA770T-UD3P's BIOS isn't as extensive as the higher-end offerings in this roundup, but there are plenty of tools available to tweakers and overclockers. Just don't expect to break any frequency records.

The MA770T-UD3P has PS/2 mouse and keyboard ports on its I/O backplane, along with eight USB 2.0 ports, analog and digital audio I/O, dual FireWire ports, and a single Gigabit LAN jack. The MA770T-UD3P ships with a basic bundle including an IDE cable, two SATA cables, a users manual, driver CD, and custom I/O shield. Current street prices on this board hover in the $80 range, which make it an absolute bargain.

Gigabyte MA785G-UD3H

The MA785G-UD3H is yet another budget-friendly Socket AM3 board from

Something For Everyone: Socket AM3 Motherboard Specs

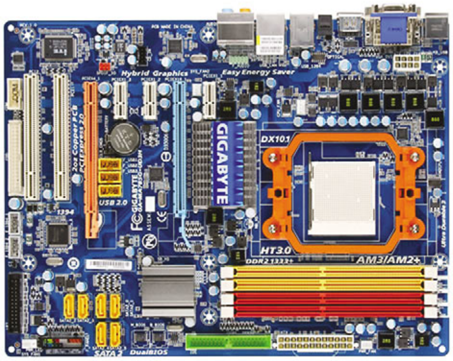
	ECS Black Series A785GM-M	ASRock M3A785GMH/128M	Asus M4A785TD-M EVO	Gigabyte MA770T-UD3P	Gigabyte MA785G-UD3H	MSI 790FX-GD70	Asus Crosshair III Formula
Chipset	AMD 785G/SB710	AMD 785G/SB710	AMD 785G/SB710	AMD 770/SB710	AMD 785G/SB710	AMD 790FX/SB750	AMD 790FX/SB750
Form Factor	MicroATX	MicroATX	MicroATX	ATX	ATX	ATX	ATX
PCI-E x16 slots	1	1	1	1	2	4	2
PCI-E x1 slots	2	1	1	4	3	1	3 (1 reserved for audio)
PCI slots	1	2	2	2	2	2	1
SATA ports	6 (+2 eSATA)	5 (+1 eSATA)	5 (+1 eSATA)	6	6	8 (+1 eSATA)	5 (+1 eSATA)
IDE channels	1	1	1	1	1	1	1
RAID support	0, 1, 10	0, 1, 10	0, 1, 0+1, 5	0, 1, 0+1	0, 1, 0+1	0, 1, 0+1, 10, 5	0, 1, 10, 5
Multi-GPU support	Hybrid CrossFire	Hybrid CrossFire	Hybrid CrossFire	None	CrossFire, Hybrid CrossFire	CrossFireX	CrossFireX
Chipset/ VRM cooling	Passive/ Passive	Passive/ None	Passive/ Passive	Passive/ None	Passive/ None	Passive/ Passive	Passive/ Passive
Price	$87.99	$84.99	$89.99	$79.99	$89.99	$164.99	$199.99
CPUs	●●●	●●◖	●●●◖	●●●●	●●●●	●●●●◖	●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Gigabyte. And although this one is based on the AMD 785G chipset, it can be considered somewhat of a cross between an entry-level HTPC-friendly board and an enthusiast-class product.

Like all of the other 785G-based motherboards in this roundup, the MA785G-UD3H has a full complement of display outputs (HDMI, DVI, and VGA) on its I/O cluster, but its slot configuration can also accommodate a pair of graphics cards. That means that this board can be used in a low-power, Hybrid CrossFire configuration or in a high-powered CrossFireX setup.

In general, the layout of the board is good. It is built around Gigabyte's signature blue PCB, with brightly colored connectors and accents. Most of its connectors and headers are positioned well around the edges of the board. Three of its USB expansion headers, however, are located just above the lower PEG slot, which isn't ideal and will cause some cable management issues for anyone who uses the ports. And if you install a dual-slot graphics card in the lower PEG slot, you'll need to use right-angle SATA cables on a couple of SATA ports.



MA785G-UD3H
$89.99
Gigabyte
● ● ● ●

AM3 Mobo Madness

As you'll see in the results table, throughout virtually all of our testing, each of the motherboards featured here put up similar scores in the mostly processor-bound tests, such as the LAME MT and Cinebench 10 benchmarks, for example. Overall, the AMD 790FX chipset-based motherboards when paired with a discrete graphics card put up the best scores. However, it's worth noting that the AMD 785G-based motherboards were relatively strong performers, considering the low-end nature of their integrated Radeon HD 4200 graphics processors. It was only in a few of the PCMark Vantage tests and in Crysis that the 785G's IGP held the test system back.

Ultimately, we recommend power users looking to assemble a high-end, quad-core Phenom II-based system stick with either the 790FX or 770 series chipsets. Both of them perform well and are very overclockable, and boards built around them aren't short on features. If you don't plan to run a multi-GPU setup, the 770 is a great price/performance option.

Users in the market for a low-cost motherboard based on the 785G have a lot of options to consider. It's worth noting that the addition of side-port memory on the 785G does offer somewhat higher performance for a minimal increase in price, so we'd recommended seeking motherboards with this feature. ▲

	ECS A785GM-M*	ASRock M3A785GMH/128M*	Asus M4A785TD-M EVO*	Gigabyte GA-MA77OT-UD3P**	Gigabyte GA-MA785G-UD3H*	MSI 790FX-GD70**	Asus Crosshair III Formula**
PCMark Vantage (Default Settings)							
Overall	5425	5412	5436	5586	5415	5634	5609
Memories	4840	4854	4893	5294	4872	5216	5381
TV and Movies	4538	4521	4551	4537	4547	4531	4542
Gaming	3612	3964	3886	5889	3722	5896	5884
Music	5184	5216	4591	5537	4627	5435	5681
Communications	5243	5197	5382	5293	5468	5412	5359
Productivity	5021	4986	5137	5094	5241	5192	5106
3DMark06 (Default Settings)							
CPU score	4450	4442	4446	4458	4451	4469	4462
Cinebench R10							
Multithreaded	10526	10528	10532	10588	10523	10592	10521
LAME MT* **							
Multithreaded	0:33	0:33	0:33	0:33	0:33	0:33	0:33
Crysis v1.21							
800 x 600, Low Quality	33.19	38.67	39.21	131.43	34.52	131.94	131.62

*ATI Radeon HD 4200 used in testing

**Nvidia GeForce GTX 280 used in testing

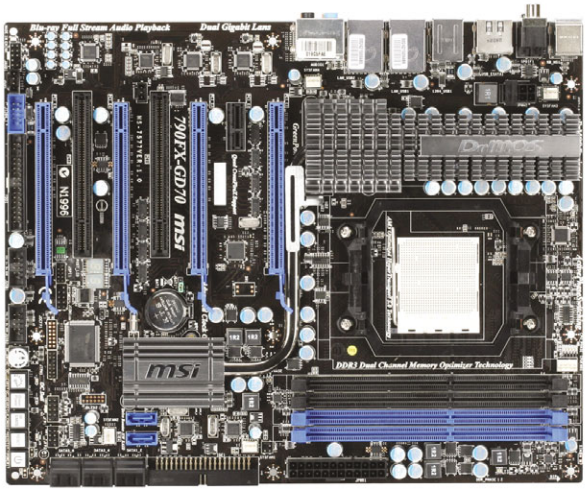
***minutes:seconds

Test system specs: CPU: AMD Phenom II X4 955 Black Edition (3.2GHz); Memory: Corsair 4GB DDR3-1333; Hard Drive: Western Digital 10,000rpm Raptor 150GB; OS: Windows Vista Ultimate

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ● ● ◖ 2.5 = ABSOLUTELY AVERAGE | ● ● ● ● ● 5 = ABSOLUTELY PERFECT

The MA785G-UD3H's chipset is cooled by a pair of simple aluminum heatsinks, but the components in the VRM are left bare. This shouldn't be an issue, though, as the board runs relatively cool. Its BIOS has a fairly broad selection of options and should please all but the most ardent overclocking enthusiasts. Stability was excellent throughout testing.

There is no single, stand-out feature on the MA785G-UD3H, but it covers all of the basics at an aggressive price. This is definitely a great motherboard for the money.


Blu-ray Full Stream Audio Playback
Dual Gigabit Lans
790FX-GD70 msi
msi
DrMOS
DDR3 Dual Channel Memory Optimizer Technology

790FX-GD70
$164.99
MSI
www.msicomputer.com
● ● ● ● ◖

MSI 790FX-GD70

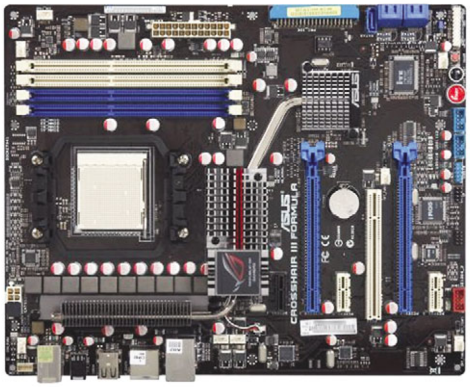
Right from the get-go, it's clear MSI designed the 790FX-GD70 with hardcore enthusiasts in mind. As its name makes evident, the motherboard is built around the high-end AMD 790FX chipset. Said 790FX is paired to the SB750 southbrige, which makes for a potent overclocking combination in addition to a board that's loaded with features.

The MSI 790FX-GD70 has an impeccable layout and a number of unique features. The board exploits all of the features inherent to the chipset and even adds a few more, courtesy of MSI's engineers. There are four PEG slots on the 790FX-GD70, which, of course, support CrossFireX. The chipset and VRM are cooled by an enormous heatsink/heatpipe assembly that do a great job of keeping temperatures in check, and the board's BIOS is geared specifically to discerning overclockers.

Speaking of overclockers, the 790FX-GD70 also features a unique OC Drive dial that gives users the ability to literally turn a knob to dial in an overclock—no special software necessary. Right next to the OC Dial are a number of other buttons that control basic functions such as power, reset, and clear CMOS. There is also a button that toggles the board's Green Power adaptive phase system (another technology that adjusts active power phases based on load) and an LED POST code error reporter.

The 790FX-GD70's bundle is also loaded with a number of cables, power adapters, software, CrossFire bridge connectors, and manuals that explain the board's many features. The board's performance and stability were also top notch.

Although it may not be the most feature-laden 790FX board available, MSI has done a tremendous job with the 790FX-GD70. Enthusiasts itching to build a high-end AM3-based system should seriously consider this motherboard.



Crosshair III Formula
$199.99
Asus
● ● ● ●

Asus Crosshair III Formula

The Asus Crosshair line of boards has been a favorite among enthusiasts, due to its lengthy list of features and overclocking ability. The latest in the line, the Crosshair III Formula, is definitely a worthy successor to the original and Crosshair II, but it falls short of the bar set by the MSI 790FX-GD70.

Like the 790FX-GD70, the Asus Crosshair III Formula has an extremely comprehensive BIOS; overclockers will want for nothing. It also has integrated power and reset switches, and one-ups the 790FX-GD70 with an external POST code error reporter and a superior X-Fi audio expansion card. MSI's offering, however, has a more flexible slot configuration and more connectors/ports in its I/O backplane. It's more affordable, too.

That said, the Crosshair III Formula is an excellent product. The layout is very good; it's quite the looker with its lighted "Republic of Gamers" badge and elaborate cooling apparatus, which covers the chipset and VRM. The board is also rock-solid stable, performs well, and is highly overclockable. We would've liked to have seen a more flexible expansion slot configuration that included at least one more PCI-E x16 slot, but that's a relatively minor quibble.

The Crosshair III Formula is a killer motherboard that would serve AMD fans well. At about 200 bucks, though, it's relatively pricey, especially in light of MSI's offering. ▲

by Marco Chiappetta

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ● ● ◖ **2.5 = ABSOLUTELY AVERAGE** | ● ● ● ● ● **5 = ABSOLUTELY PERFECT**

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P55 Express Pantheon

We Put Ibex Peak To The Test

Although Intel's recently introduced, Lynnfield-based Core i5 and Core i7-800 series processors have been billed as mainstream alternatives to the company's flagship Bloomfield-based Core i7 lineup, the Lynnfield variants are actually more advanced on a technical level. Both Lynnfield and Bloomfield share what are essentially the same execution cores, but Lynnfield-based parts are outfitted with a second-generation Turbo Mode implementation as well as another first for a CPU: 16 lanes of integrated PCI-E 2.0 connectivity. Lynnfield and Bloomfield differ in a few other ways, as well, namely Lynnfield's dual-channel integrated memory controller, larger die, new socket, and the elimination of QPI, which is no longer needed.

Because of all of the differences between Lynnfield and Bloomfield, a new chipset was required to bring the Core i5 and Core i7-800 series to market; hence, the P55 Express was born. Calling the P55 Express a chipset is somewhat of a misnomer, however, because it consists of only a single chip. Nonetheless, the P55 Express is the chipset that accompanied the Core i5 and Core i7-800 series to market when the new processors launched, and motherboard manufacturers have embraced it fully, with all of the major players releasing multiple designs based on the P55 Express, at varying prices.

What sets the P55 Express apart from other Intel chipsets, other than the fact that it is a single-chip offering, is that it resembles a traditional southbridge more than anything else. Due to the fact that Core i5 and Core i7-800 series processors feature integrated memory controllers and 16 lanes of on-die PCI-E 2.0 connectivity, virtually all of the functionality previously integrated into a northbridge is now located on the CPU die itself. That leaves the need to handle the functions associated with the southbridge, which is where the P55 Express comes in.

The P55 Express connects to the processor via an interface capable of 2GBps of bandwidth, dubbed DMI (Direct Media Interface). The use of a higher-bandwidth interconnect, such as QPI, was necessary with Lynnfield because the most bandwidth-hungry components on the desktop—graphics cards, for example—are connected directly to the processor via its integrated PCI-E lanes. The P55 Express chipset features support for 14 USB 2.0 ports, an additional 8 PCI-E 1.0 lanes, integrated Gigabit Ethernet MAC, HD audio, and six SATA ports with support for Intel's Matrix Storage technology.

With the huge influx of P55 Express-based motherboards recently, now is a good time to put an assortment of motherboards to the test, roundup-style. We have six P55 Express-based motherboards on tap for you here, with prices ranging from about $150 to more than $300. Is it worth paying for one motherboard when another board at half the price of the first uses the same chipset? Let's find out.

GA-P55-UD4P
$169.99 | Gigabyte
www.gigabyte.us
●●●◖

Gigabyte GA-P55-UD4P

Gigabyte's midrange GA-P55-UD4P is built upon Gigabyte's signature blue PCB, and it features seven expansion slots (two PEG, three PCI-E x1, two PCI) and small aluminum heatsinks on the VRM and chipset. One of the motherboard's heatsinks (the one in the traditional northbridge position), though, isn't really mounted to anything. It's basically just floating behind the first PCI-E x1 slot, but it is connected to the VRM heatsinks via a heatpipe, so it does aid a bit in heat dissipation.

The GA-P55-UD4P's pair of PEG slots support SLI and CrossFire, and there's a multitude of connectivity options along the I/O backplane, including dual LAN ports, eSATA, numerous USB ports, FireWire, and various audio inputs and outputs. The GA-P55-UD4P is also outfitted with 10 SATA ports, 4 DIMM slots, and a single IDE port. There's even a floppy drive header, should you be inclined to use it.

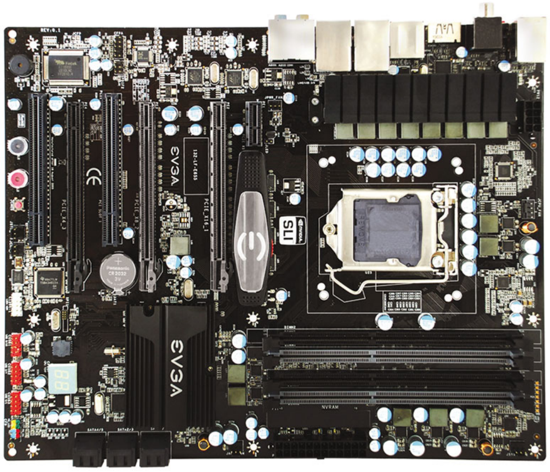
We should also point out that the GA-P55-UD4P is a member of Gigabyte's Ultra Durable 3 family, which means it sports two ounces of copper layers in its PCB, solid Japanese capacitors, lower Rds (which stands for "drain to source on resistance"; lower rds means less power loss) MOSFETs, and ferrite core chokes. These features don't necessarily increase benchmark performance, but the use of these higher-quality materials should enhance the board's long-term reliability and durability. The GA-P55-UD4P's BIOS is outfitted with all of the amenities you would expect from Gigabyte, even though the GA-P55-UD4P is somewhat of a value-priced offering, and it was rock-solid throughout all of our benchmarking.

For the money, the GA-P55-UD4P is an excellent option. The board's layout is generally good, not lacking features. It was perfectly stable, and performance was very good. Not bad, considering the GA-P55-UD4P was the least expensive ATX motherboard in the group.

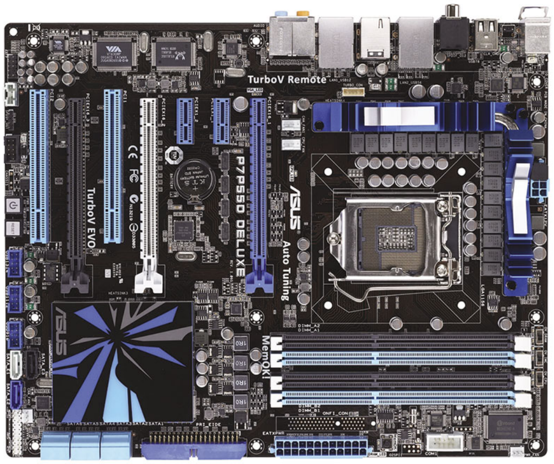
Evga P55 SLI

As its name suggests, Evga's P55 SLI supports SLI, but CrossFire configurations are supported, as well. It's a few less obvious features that make this mobo interesting, however. Another interesting feature of the Evga P55 SLI has to do with its CPU cooler mounting holes. Unlike most other P55s, the Evga P55 SLI is outfitted with CPU heatsink mounting holes that are compatible with both legacy Socket 775 and newer Socket 1156 heatsinks. If you dumped a bunch of cash on a third-party Core 2 heatsink and want to reuse it, the Evga P55 SLI could save you a bit of money. Then again, at about $200, the P55 SLI itself isn't exactly cheap.

Additional features of the Evga P55 SLI include a lighted emblem at the board's center, dual clock generators for the CPU and PCI-E interfaces to ensure clean signals while overclocking, a POST code error reporter, onboard power and reset switches, and dual-BIOS chips. Relatively large aluminum heatsinks are mounted to the components in the VRM and chipset. Clear CMOS switches are situated along the bottom edge of the board and in the I/O backplane.



P55 SLI
$199.99 | Evga
www.evga.com
●●●



P7P55D Deluxe
$219.99 | Asus
www.asus.com
●●●◖

The layout of the P55 SLI is excellent, with all headers and ports positioned around the edges of the PCB, and there's plenty of room around the CPU socket. As Evga has done with a number of its other enthusiast motherboards, the P55 SLI is also equipped with a meaty BIOS that lacks nothing in terms of overclocking and performance tweaking. If there's a BIOS feature related to overclocking or performance out there, the Evga P55 SLI has it.

Performance with the P55 SLI was also very good, as you'll see in the sidebar, and stability was top-notch. Although we really liked the P55 SLI's features and ultimately have no complaints from a technical perspective, we do wish the board was more affordable. At about $200, it's nowhere near the most expensive P55 board in our roundup, but it definitely lands on the higher end of the spectrum in comparison to other P55 Express-based motherboards.

Asus P7P55D Deluxe

In addition to exploiting all of the features inherent to the P55 Express itself, the Asus P7P55D Deluxe offers a number of interesting additions to complement the chipset. It may be tough to see, but the P7P55D Deluxe is built upon a dark-colored PCB, with some aggressive-looking, oversized heatsinks on the VRM and chipset. An interesting note about the VRM design on this board is that it has a hybrid 16+3 phase configuration, where 16 phases are dedicated to the processor cores and three to the CPU's integrated memory controller. In addition, the VRM contains low Rds MOSFETs, ferrite core chokes, and Japanese capacitors. There are heatplates on the underside of the VRM to further aid in cooling.

Another clever feature included on the P7P55D Deluxe is an integrated Asus T.Probe chip, which detects and balances power phase loads and temperatures on the fly. According to Asus, T.Probe helps the VRM components run cooler, with more even power distribution across active phases, which should extend the board's life span while offering more stable power output.

The P7P55D Deluxe also sports Asus' TurboV Evo chip for real-time overclocking and tweaking assistance. And the TurboV Evo chip is complemented by an included TurboV Remote, which uses a proprietary connection and gives users the ability to adjust BCLK, voltage, and power settings directly from the controller, without having to exit whatever application may be loaded on the system.

Overall, the layout of the Asus P7P55D Deluxe is impeccable, with good placement of all expansion headers and ports and memory and graphics card retention clips that won't interfere with nearby components and are easy to access. And, as we've come to expect from Asus, the P7P55D Deluxe's BIOS is also rife with a ton of features.

The Asus P7P55D Deluxe is an undeniably good P55 Express-based motherboard that would make for an excellent foundation of a Lynnfield system. At roughly $219, it's not cheap by any means, but if you have the funds, accessories such as the TurboV Remote take away some of the sting of the board's higher price.

Evga P55 Classified 200

The Evga P55 Classified 200 is different from every other P55-based mobo we've seen and offers a myriad of unique features. A few of the features that make it different are its 10-phase digital VRM with dual 8-pin feeds, its gold-infused

Intel P55 Express Lynnfield-Compatible Motherboard Performance Comparisons

We equipped our testbed with a Core i7-870 processor and a selection of complementary high-end components to assess the performance of our P55 Express-based motherboards. We began with 4GB of Corsair DDR3-1600 RAM, a GeForce GTX 280 graphics card, and a Western Digital Raptor 150GB HD. We installed Windows 7 Ultimate x64 Edition, along with all of the necessary drivers available for each motherboard and the graphics card.

Before we began testing, we set each board to its optimized or high-performance defaults. Then, we manually configured the base clock frequency and locked in the memory timings via each board's system BIOS. Some motherboard manufacturers have been known to tweak their boards slightly, even at default settings, so manually setting these options in the BIOS levels the playing field somewhat and ensures each motherboard operates with as close to identical settings as possible.

If you're on a tight budget and are in the market for a P55 Express-based motherboard, rest assured that you won't be sacrificing much, if any, performance by going with a more affordable offering. Some features may be missing from budget-friendly P55 boards, however. Of the six motherboards we tested, the Gigabyte GA-P55-UD4P and Evga P55 SLI seemed to strike the best balance of performance and features, but the over-the-top configurations of the Maximus III Formula and P55 Classified 200 appeal to the hardcore enthusiast in us.

	Gigabyte GA-P55-UD4P	Evga P55 Classified 200	Asus P7P55D Deluxe	Evga P55 SLI	Asus Maximus III Formula	Gigabyte P55M-UD4
PCMark Vantage (Default Settings)						
PCMarks	9784	9173	9224	9107	9020	8851
Memories	7561	7339	7186	7317	7175	7112
TV and Movies	5695	5685	5734	5693	5702	5647
Gaming	10377	10381	10398	10399	10410	10209
Music	8712	8216	8316	8158	8092	8264
Communications	8481	8139	8213	8164	8095	7393
Productivity	8316	7883	7726	7762	7752	7637
3DMark06 (Default Settings)						
CPU Benchmark	5598	5581	5612	5574	5572	5486
Cinebench R10						
Multithreaded	19104	18891	18994	18796	18886	18645
LAME MT*						
Multithreaded	0:25	0:25	0:25	0:25	0:25	0:26
x264 HD Encoding**						
First Pass	81.76	81.62	81.89	81.12	81.88	81.56
Second Pass	30.89	30.13	30.67	30.26	30.51	29.45
WinRAR v3.9 x64*						
File compression	1:33	1:34	1:34	1:34	1:35	1:35
Crysis v1.21 (FPS)						
800 x 600, Low Quality	166.82	166.12	167.46	164.18	167.33	161.48

Test system specs: CPU: Core i7-870 (2.8GHz); Memory: Corsair 4GB DDR3-1333; Graphics: GeForce GTX 280; Hard Drive: Western Digital Raptor 150GB; OS: Windows 7 Ultimate x64
*(minutes:seconds) **frames per second

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

CPU socket, its all PCI-E expansion slot configuration, and the board's wide array of overclocking and tweaking options, just to name a few.

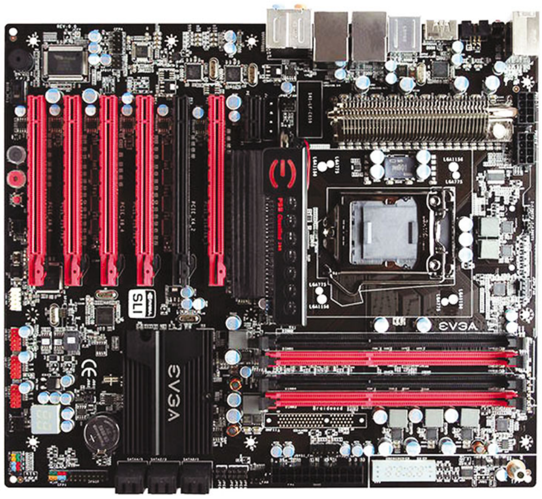
Like the P55 SLI, the P55 Classified 200 is built around a dark-colored PCB with mounting holes for both Socket 775- and 1156-compatible coolers, but the Classified 200 has black and red accents instead of black and gray. There's a large heatsink covering the VRM and a smaller Evga-branded heatsink on the chipset itself. A third heatsink is affixed to the nForce 200 PCI-E switch that enables the board's unusual expansion slot configuration.

In addition to the aforementioned items, there are other unique touches sprinkled throughout the board. For example, the LED POST code error reporter installed on the P55 Classified 200 also acts as a CPU temperature sensor once the system has fully booted. There's also a bank of jumpers to disable PCI-E lanes for troubleshooting purposes. Power, reset, and clear CMOS buttons are onboard, and there's an additional clear CMOS button on the I/O backplane.

The P55 Classified 200's CPU socket also sports a couple of interesting features, too. For example, the socket's gold content is 300% higher than the sockets used on most other motherboards for better electrical conductivity. Additionally, the socket uses LICCs (low inductance ceramic capacitors) for better power efficiency. The P55 Classified 200 is outfitted with three BIOS EPROMS, as well, with a companion switch that gives users the ability to choose between BIOS chips should you want to save different profiles to different chips or experiment with multiple BIOS revisions. Speaking of the BIOS, it is simply jam-packed with options. Overclockers will certainly be pleased.

Evga has also incorporated something it calls Show-Volt into the P55 Classified 200. The Show-Volt feature is basically an integrated volt meter: There is an onboard LED screen between the DIMM slots and ATX power connector that will display voltages probed from contact pads along the top edge of the board. The board's six physical PCI-E x16 slots break down to five PCI-E x16/x8, one PCI-E x4, and one PCI-E x1 connections, also unique to the other P55s in this roundup.

For such a feature-packed motherboard, the Evga P55 Classified 200 has a nice, clean layout. The board's EATX form factor surely helped Evga with component placement, but the engineers did a good job nonetheless. Strictly taking features into consideration, the Evga P55 Classified 200 is *the* enthusiast-class P55-based board to own currently. Its $350 price tag is simply way too high for a P55, though.



P55 Classified 200
$349.99 | Evga
www.evga.com
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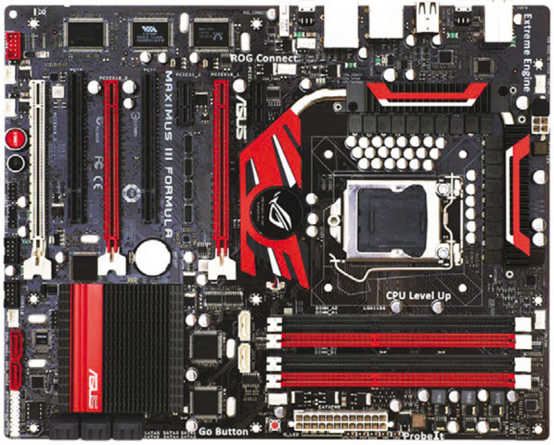

Maximus III Formula
$249.99 | Asus
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Asus Maximus III Formula

Like other members of Asus' Republic of Gamers series of motherboards, the Maximus III Formula is built around a dark-colored PCB that features red, white, and black accents. The board's four DDR3 DIMM slots use smaller retention clips on the lower end to prevent them from interfering with long graphics cards or the two SATA ports mounted nearby.

Two more SATA ports rest along the bottom edge of the PCB, and six more are mounted horizontally behind the P55 chipset heatsink, which is a relatively large aluminum block with numerous fins. Although this chipset heatsink on the Maximus III Formula isn't linked to any others via heatpipes, the P55 chipset doesn't generate much heat; this simple configuration should be more than sufficient for most applications.

The Maximus III Formula's expansion slot configuration consists of three PCI-E x16 slots, two PCI-E x1 slots, and two legacy PCI slots. One of the x1 slots is positioned right in front of a large heatsink adorned with the RoG badge, so it may be unusable with some expansion cards. Also note that the PEG slots have extra-large retention clips, which makes it much easier to remove cards when multiple slots are filled (even if you have big fingers like some *CPU* reviewers).

The layout of the Maximus III Formula is typical of a RoG series product, and it is pretty good, save for the odd

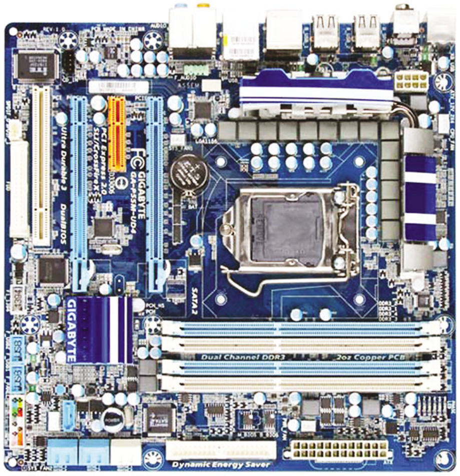
CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

placement of a few of the board's SATA ports. The I/O backplane is loaded with a host of connectivity options, including a new feature branded RoG Connect. The RoG Connect port in the backplane gives users the ability to connect the board to a second system (for example, a netbook) for real-time hardware monitoring and tweaking, kind of like what gearheads do when tuning a car.

As usual, Asus also did a fine job with the Maximus III Formula's BIOS, which is stellar in every department, and performance and stability were very good. All things considered, we think the Maximus III Formula is a great P55 motherboard if you can afford the relatively high asking price.

Gigabyte GA-P55M-UD4

The Gigabyte GA-P55M-UD4 is basically a more affordable, microATX equivalent of the GA-P55-UD4P; it has a different expansion slot configuration and slightly fewer features. The PCB and overall color scheme of both motherboards is essentially identical, and they have very similar BIOS menus and heatsinks, although the GA-P55M-UD4 does lack the floating heatsink that's connected to the VRM on the UD4P.



P55M-UD4
$149.99 | Gigabyte
www.gigabyte.us
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Also missing from the GA-P55M-UD4 is one GigE LAN port and two SATA ports (one SATA, one eSATA).

The Gigabyte GA-P55M-UD4's slot configuration consists of dual PCI-E x16 slots, a single PCI slot, and a single PCI-Express x4 slot, which is notched to accept x8 or x16 expansion cards.

Although the Gigabyte GA-P55M-UD4 conforms to the microATX form factor, nothing about the board seems cut down or lacking (save for its physical dimensions, of course). Performance of the board was slightly lower than its full-sized ATX counterparts in our tests, but it's nothing to be concerned about. Ultimately, the Gigabyte GA-P55M-UD4 is an excellent option that's well-suited to a variety of different applications, thanks to its smaller form factor. It doesn't hurt that it was the least expensive P55-based board we reviewed, either. ▲

by Marco Chiappetta

P55 Express Mobos Under The Microscope

	Gigabyte GA-P55-UD4P	Evga P55 SLI	Asus P7P55D Deluxe	Evga P55 Classified 200	Asus Maximus III Formula	Gigabyte P55M-UD4
Form Factor	ATX	ATX	ATX	EATX	ATX	MicroATX
Audio	Realtek ALC889 HD (8.1 channels)	Realtek ALC889 HD (8.1 channels)	VIA VT2020 (10 channels)	Realtek ALC889 HD (8-Channel)	SupremeFX X-Fi discrete Audio Card (8-Channel)	Realtek ALC889A (8-Channel)
Ethernet	Gigabit Ethernet (x2)	Gigabit Ethernet (x2)	Gigabit Ethernet (x2)	Gigabit Ethernet (x2)	Gigabit Ethernet	Gigabit Ethernet
Max memory	16GB (DDR3-2200)	16GB (DDR3-2600)	16GB (DDR3-2200)	16GB (DDR3-2600)	16GB (DDR3-2133)	16GB (DDR-2200)
PCI-E x16 slots	2	3 (2 x16/x8, 1 x4)	3 (2 x16/x8, 1 x4)	6 (5 x16/x8, 1 x4)	3 (2 x16/x8, 1 x4)	2
PCI-E x4 slots	0	0	0	0	0	1
PCI-E x1 slots	3	1	2	1	2	0
PCI slots	2	2	2	0	2	1
SATA	8, 2 eSATA	6, 2 eSATA	9	6, 2 eSATA	10, 1 eSATA	7, 1 eSATA
IDE Channels	1	0	1	0	0	1
RAID support	0, 1, 5, 10	0, 1, 0+1, 5	0, 1, 5, 10	0, 1, 0+1, 5	0, 1, 5, 10	0, 1, 5, 10
CrossFire/SLI	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Chipset/VRM cooling	Passive/Passive	Passive/Passive	Passive/Passive	Passive/Passive	Passive/Passive	Passive/Passive
Price	$169.99	$199.99	$219.99	$349.99	$249.99	$149.99
CPUs	●●●◖	●●●	●●●◖	●●●◖	●●●	●●●◖

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

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AMD ATI Radeon HD 5870

The King Is Dead, Long Live The King

Other reviewers have used phrases like "world's fastest GPU," "Editor's Choice," and "Gold Award" to describe the graphics card that wears the pants in AMD's forthcoming Evergreen family of graphics cards. Read on to see if the DirectX 11-infused Radeon HD 5870 has what it takes to push your gaming experience to the next level.

The R870's Got Guts

The R870 GPU in the Radeon HD 5870 was built using AMD's TeraScale 2 architecture, so named because of the GPU's total raw compute power of 2.72 teraflops. At the launch, AMD's CTO of Graphics Products Group, Eric Demers, tried to discourage folks from rounding. For a little perspective, rounding the R870's compute muscle to 2.7 teraflops effectively lops off more than the theoretical maximum compute power of IBM's Deep Blue. Garry Kasparov would disapprove.

The R870 is a 334mm^2 die that consists of 2.15 billion transistors, compared to the 956 million transistors on the 263mm^2 R770 die. The new GPU is AMD's second built using the TSMC 40nm fabrication process, which helped the firm's engineers cram almost 1.2 billion more transistors on a chip that's just 27% larger than the R770. AMD doubled the number of SIMD (single instruction multiple data) engines from 10 in the R770 to 20 in the R870. As a result, the 5870 has double the stream processors (1,600), texture units (80), and ROPs (32). These improvements effectively translate to substantially improved antialiasing resolve, better texture bandwidth, and superior shader performance. But doubling a GPU's specs is harder than it sounds.

According to Carrell Killebrew, the lead engineer on the R870, AMD had to enlarge the L2 cache size (from 64 to 128KB each) and increase the number of L1 caches (a faster texture cache and a new computational cache per each SIMD engine) to accommodate for all that extra processing power.

Under The Hood

Unlike with previous cards, the Radeon HD 5870's pin-striped heatsink shroud extends from the backplane to the edge of the 10-inch-long PCB, similarly to the latest GeForce GTX cards. The backplane features two DVI ports, an HDMI port, and a DisplayPort interface. For more on the Radeon HD 5870's technology, turn to "X-Ray Vision: Radeon HD 5800" on page 52.

Power consumption is an important spec to note. Under load, the Radeon HD 5870 consumes 188 watts, which is 28 watts more than that of the 4870. But perhaps most impressively, idle power is a mere 27 watts, or less than a third of the 4870's idle power.

Windows 7 Specs & Scores

	Radeon HD 5870	Asus Radeon HD 4870 X2	XFX Radeon HD 4890
Price	$379		
Core Clock	850MHz	750MHz	900MHz
Memory Clock	1,200MHz	900MHz	975MHz
Memory	1GB GDDR5	2GB GDDR5	1GB GDDR5
3DMark Vantage Performance			
Overall	P10930	P12968	P10187
GPU Score	11173	14343	10213
GPU1 (fps)	31.76	41.37	29.5
GPU2 (fps)	33.73	42.68	30.35
CPU Score	10263	10073	10111
CPU1 (Plans/s)	1320.89	1328.46	1324.61
CPU2 (Steps/s)	16.10	14.99	15.28
3DMark Vantage Extreme			
Overall	X6050	X7550	X4896
GPU Score	5921	7448	4766
GPU1 (fps)	17.28	24.38	15.72
GPU2 (fps)	17.41	19.17	12.15
CPU Score	10314	10193	10102
CPU1 (Plans/s)	1326.15	1328.19	1326.91
CPU2 (Steps/s)	16.21	15.58	15.17
Games			
Far Cry 2 (4XAA)	60.23	75.42	51.30
Left 4 Dead (8XAA, 16XAF)	129.37	135.53	118.45
Crysis (4XAA)	29.67	38.6	29.83
Far Cry 2 (4XAA)	47.91	66.36	44.79
Left 4 Dead (8XAA, 16XAF)	97.24	111.58	83.05
Crysis (4XAA)	20.51	27.55	18.67
Far Cry 2 (4XAA)	35.78	45.7	31.79
Left 4 Dead (8XAA, 16XAF)	67.22	73.86	52.58
Crysis (4XAA)	11.34	13.76	10.59

The Numbers

We benchmarked the Radeon HD 5870 against a stock-clocked Radeon HD 4870 X2 from Asus and an overclocked Radeon HD 4890 from XFX in Windows Vista and Windows 7 (RTM 7600.16385). The Radeon HD 5870 impressively split the difference between the two cards but failed to topple the 4870 X2; the imminent Radeon HD 5870 X2 is sure to be an unstoppable force when it lands this October. The 5870 is a great card for maxing out your settings at high resolutions, but we'll have to wait to determine DX11 performance. ▲

Radeon HD 5870
$379 | AMD
ati.amd.com
●●●●

by Andrew Leibman

(For Vista performance data, subscribers can go to www.cpumag.com/radeon5870.)

Specs: GPU: Cypress R870; Core clock: 850MHz; Memory: 256-bit bus, 1GB GDDR5 (1,200MHz); 1,600 shaders processors; 80 texture units; 32 ROPs

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Aerocool Touch 1000

In the October 2009 issue, we took a look at Aerocool's Touch 2000 fan controller and found it to be a worthy accessory for any system with fans in need of serious observation. (See page 36.) This month, we're setting our sights on the Touch 2000's little brother, the Touch 1000.

The Touch 1000 offers a single control panel where you can monitor and control the speeds of up to four fans. With the included heat sensors, you can also keep tabs on the temperature of up to four areas in your case. Like the 2000, the Touch 1000 features an LCD touchscreen, which measures about 1 x 4.5 inches (HxW). Whereas the 2000 takes up two 5.25-inch drive bays, the Touch 1000 occupies only one, an advantage for those of us who don't have extra bays to spare.

Cycling through and adjusting a specific fan is as easy as pressing the yellow left/right icons and the plus (+) and minus (-) icons, respectively. The Touch 1000 has four labels (CPU, VGA, HDD, and SYS) that correspond to each fan connection, making it easy to determine which fan you are adjusting. You can't change these labels, so if you match a second graphics card to the HDD label, you'll have to make a mental note of which label corresponds to which fan. And like the 2000, the Touch 1000 sports a user-definable overheating alarm for each fan.

The LCD touchscreen was responsive and easy to use. If your computer sits on your desktop, the LCD's bright backlight could cause a glare issue, and there's no option to reduce the screen's brightness.

The Touch 1000 has a $49.99 price tag, which is only 10 bucks cheaper than the 2000, despite its smaller LCD and lack of front I/O ports. But the 1000 packs all the same features in a smaller form factor, perfect for midtower or SFF cases where drive bays are limited, so we're stating the price as a fair buy. ▲

Touch 1000
$49.99
Aerocool
www.aerocool.us
● ● ● ●

Specs: Dimensions: 1.7 x 5.9 x 2.8 inches (HxWxD); Display: LCD touchscreen; Connectors: 4 3-pin connectors, 4 heat sensors; Max wattage per fan: 6W

by Kris Glaser

Microsoft Wireless Desktop 3000

With respect to gamers, not everyone buying a new desktop combo wants to boost in-game precision and kill ratios. Some of us just want a durable set that ups productivity. For these users, the Wireless Desktop 3000—Microsoft's first desktop combo to offer its BlueTrack technology—is aces.

Both the Wireless Mouse 5000 ($39.95 separately) and Wireless Keyboard 3000 v2.0 ($39.95) that make up the set use two AA batteries and don the same snazzy black-and-white color scheme. The keyboard adds splashes of blue to offset the FUNCTION keys and several shortcut keys. Both devices' glossy exteriors attract fingerprints like a magnet draws metal but resists dust and water. The keyboard also includes channels to funnel liquid away in case of spills.

Although the five-button Wireless Mouse 5000's symmetrical design wasn't an ideal match for my hand, its rubberized side grips provide some nice texture. The tilting scroll wheel, meanwhile, flows like water but is notchless, so don't expect pinpoint game maneuvering. Do expect excellent tracking via BlueTrack, which Microsoft says works on nearly any surface but glass and mirrored surfaces. I first encountered BlueTrack with the Explorer Mini Mouse ($59.95) in 2008. As with that mouse, I successfully tested Microsoft's claim with the 5000 on granite, paper, carpet, cloth, wood, plastic, steel, and my palm. Note, however, that Logitech claims its recently launched Darkfield laser technology does work on glass and mirrored tops.

Despite their quietness, the Wireless Keyboard 3000's thin-profile keys pack a noticeable "clicky" tactile punch and good action, speed-wise. Arguably better, the board is overflowing with useful shortcuts/hotkeys, including multimedia controls and keys to launch a Web browser, Outlook, IM app, multimedia manager, favorite Web sites, My Documents, Pictures, and more. Additionally, below the FUNCTION keys are Redo and Undo; Send, Reply, and Forward; Save; Print; and other shortcuts.

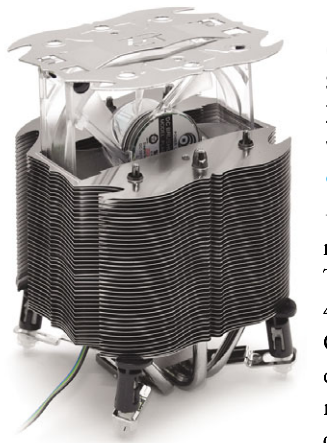
Though I'd slightly revise the mouse's contour and add some incline to the keyboard, there's tremendous value in this set, even without BlueTrack. If you appreciate scads of divergent options at your fingertips, you'll appreciate the Wireless Desktop 3000. ▲

Wireless Desktop 3000
$69.95
Microsoft
www.microsoft.com
● ● ● ◖

Specs: 2.4GHz wireless; integrated battery status indicators; snap-in transceiver storage under mouse; four-way notchless scroll wheel

by Blaine Flamig

Zerotherm CORE92



CORE92
$39
Zerotherm
www.zerotherm.net
●●●◖

Intel CPUs centering on the company's Nehalem architecture (all of which are based on a 45nm manufacturing process) are known for their overclocking headroom, often exceeding 4GHz. Until recently, however, the cheapest Core i7 cost $279. Now that the 2.66GHz Core i5-750 sells for less than $200, value-seekers have a compelling reason to upgrade their older machines and try a little tweaking. But when you open the retail-boxed Core i5-750, you'll find that its bundled heatsink is diminutive—hardly suitable for enthusiasts dreaming of aggressive overclocking. And that's when it makes sense to start shopping for a reasonably priced aftermarket cooler.

Zerotherm's CORE92 employs four push-pins mounted in a variable-width bracket compatible with older LGA 775, high-end LGA 1366, and the latest LGA 1156 CPU sockets. It won't work with any AMD platforms, but its mounting mechanism is significantly easier to use than the Thermalright MUX-120's, a notoriously difficult-to-install heatsink.

The CORE92's design makes it a theoretically strong performer. Many coolers employ liquid-filled pipes to more effectively draw heat away from the surface of a CPU. Zerotherm seizes on the increasingly popular practice of pressing these pipes directly onto the processor through a direct-contact implementation. Here, three copper heatpipes transfer heat up through aluminum fins, and a 92mm fan embedded inside the rounded cooler quickly dissipates heat.

In practice, that fan is louder than the Thermalright MUX-120's larger blower. We measured the Zerotherm at 42.7/46.3 decibels (idle/load) 1 meter away, respectively, and the Thermalright cooler at 41.8/44.3 decibels. The CORE92 significantly outperformed the Intel reference cooler, letting our Core i5-750 run stably at 4.1GHz and 1.45V. The MUX-120 performed similarly, also topping out at 4.1GHz.

The quieter CPU cooler is usually favorable, but the CORE92's solid mounting mechanism and excellent performance make it an attractive aftermarket cooler nevertheless. ▲

by Paul Cross

Specs: Materials: Aluminum base and fins, copper heatpipe; 470g; Socket support: Intel LGA 775/1366/1156; 130W cooling capacity; 900-2,500rpm, 92mm, 4-pin fan (up to 56.7cfm airflow)
Test system specs: 2.66GHz Core i5-750; 4GB Kingston DDR3-1600 (8-8-8); 160GB Intel SATA 3Gbps SSD; Gigabyte P55-UD6.

Zerotherm Nirvana NV120 PWM

Nirvana NV120 PWM
$49
Zerotherm
www.zerotherm.net
●●●●

True performance nuts don't play favorites with the best technology. One day, AMD has the fastest CPUs, and the next, it's Intel. Just when you thought Nvidia's GPUs couldn't be outperformed, ATI launches the Radeon HD 5800 series.

Thus, it's always nice to have a product designed to support a fairly universal list of upgrade options. Zerotherm's Nirvana NV120 PWM CPU cooler supports older socket interfaces from both Intel and AMD, such as LGA 775 and Socket 939, plus the latest LGA 1366-based Core i7 and Socket AM3-based Phenom II CPUs.

Given its vital statistics, we'd expect the Nirvana to really excel in facilitating a need for speed. The cooler sports a plated copper base engulfing four copper heatpipes, which dissipate heat into a large array of aluminum fins. An uncovered (watch your fingers) 120mm fan blows through the fins at up to 1,800rpm, producing up to 60cfm of airflow. Mounting the cooler is a bit of work, because it employs different clips and backplates according to your platform. But the effort is worthwhile, as the more securely installed 638g heatsink doesn't put as much stress on the motherboard as a push-pin model.

The Nirvana's real-world performance stands up to scrutiny. It did especially well with our Core i7-920 at its stock 2.66GHz, keeping our complete bench setup down to 42.4dB at idle and 43.6dB under load. That's one of the lowest deltas between idle and load (using 64-bit Prime95) we've ever seen. Also notable was that of all of the components generating noise—the PSU, Radeon HD 5850, and CPU cooler—the Nirvana was the quietest. Overclocking with the heatsink let us push our Core i7-920 to 4.08GHz—comparable to the Thermalright Ultra 120 Extreme on our bench. ▲

by Paul Cross

Specs: Materials: Copper base and heatpipes, aluminum fins; 638g; Socket support: LGA 775/1366, 939/940/AM2; 150W cooling capacity; 900-1,800rpm, 120mm fan (up to 60cfm airflow)
Test system specs: 2.66GHz Core i7-920; 6GB Kingston DDR3-1600 (8-8-8); 160GB Intel SATA 3Gbps SSD; Asus P6T

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

Ultra Products X4 1050W

Ultra Products has been somewhat quiet on the high-end PSU front since releasing its X3 line of modular units a few years ago. But the company is back in the PSU mix and looking to make some noise with its new X4 lineup of power supplies.

Users who are sticklers for cable management will probably like the fact that the Ultra X4 power supplies feature a completely modular design—even the 24-pin ATX power cable is removable. The units are also 80 Plus Bronze-certified and feature short-circuit protection, in-rush current protection, and thermal overload cutoff protection. The units also sport single 12V-rail designs for maximum compatibility and include thumbscrews, wire ties, Velcro straps, and antivibration silicone gaskets to minimize unwanted noise. Each unit sports a single bottom-mounted 135mm fan to keep it cool while generating minimal noise.

X4 1050W
$279
Ultra Products
ultraproducts.com
●●●●

We tested a 1,050W Ultra X4 PSU on the same octo-core, multi-GPU rig we've used in a number of past PSU roundups (see page 19 in the April 2009 issue), and it handled the load without incident. Being able to handle a sustained load over 750W with complete stability is a testament to the X4's durability.

If you're in the market for a fully modular PSU, Ultra's X4 power supplies are worth a serious look. The prices are competitive, and the lifetime warranty is a nice touch, too. ▲

by Marco Chiappetta

	Ultra X4 1050W
Rated continuous (W)	1,050W
Rated peak (W)	1,050W
12V rails	1
+12V continuous (A)	76
+5V continuous (A)	30
+3.3V continuous (A)	24
SLI certified	No
CrossFire certified	No
Max wattage tested	752W
Case Temp as tested	63 C
Power Factor as tested	0.99
Efficiency (as advertised)	80+ Certified (85% Typical Load)
Modular cables	Yes
Cable side	Case side
Fan(s) location	Bottom
Fans	1x 135mm
PCI-E 8-Pin	3 (6+2)
PCI-E 6-Pin	6
Main 12V	24-pin
8-Pin EPS12V	1
4-Pin 12V	1
SATA	11
Molex 4-Pin Peripheral	9
Floppy 4-Pin	9
Finish	Matte black
Length Including Cable Bend (in inches)	6.5
Warranty	Lifetime

NZXT Beta

NZXT recently expanded its already diverse line of PC enclosures with a relatively affordable model dubbed the Beta. Although the Beta can be found for around $50, don't let its budget-friendly price fool you. This case has some great features considering its wallet-friendly nature.

The NZXT Beta is a midtower case, compatible with ATX and most smaller form factors. It is built mostly of steel with a plastic and metal-mesh front bezel, and its design is somewhat subdued in light of many of NZXT's other offerings. The case's four 5.25-inch external drive bays have perforated covers to allow for better internal airflow. A large vent behind the front-panel ridges houses a lighted blue, 120mm intake fan that also aids in proper airflow. The vent and the bay covers feature foam dust filters, as well, which is good to see on a low-cost case.

Another feature of the Beta that's uncommon on affordable enclosures is a painted interior: The case's interior matches its black exterior. Speaking of the interior, there you'll find five internal 3.5-inch bays and accommodations for three more 120mm cooling fans (which aren't included)—two on the side panel and one on the rear. Although the Beta has tool-less drive rails, I found the 5.25-inch rails somewhat flimsy. Stick to using screws on your 5.25-inch drives.

There are also predrilled holes on the Beta to accommodate the tubing used in liquid-cooling kits, lighted power and reset switches, and the usual assortment of front-mounted connectors. All in all, the Beta is a decent offering, especially considering its price. Just be sure to pick up a couple of additional case fans. ▲

by Marco Chiappetta

Specs: Chassis: Steel; Motherboard support: ATX, MicroATX, Baby AT; Bays: 4 5.25-inch external, 5 3.5-inch internal; Slots: 7; Dimensions: 7.87 x 16.9 x 19.7 inches (HxWxD); Weight: 16lbs.; Fans: Front: 120mm, Rear: 120mm (optional), Side: 2 120mm (optional)

Beta
$49
NZXT
www.nzxt.com
●●●◖

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Shuttle XS29F

XS29F
$189
Shuttle
www.shuttle.com
● ● ● ◖

Before Intel's Atom arrived on the scene, VIA was master of the ultra-low-power CPU. With the new 65nm Nano processor series, though, VIA at last returns to the ring with a platform able to give Intel a run for its money. The Nano U-series sips power at the barest levels: as low as 100mW at idle and 5W TDP. Paired with VIA's VX800 chipset and set in Shuttle's fanless chassis, this is a platform well-targeted at anyone needing nettop-class performance in a package a little bigger than a thick hardback book. All told, the entire box tops out at less than 50W total draw.

Shuttle loads the XS29F bare-bones system with its own FM26 motherboard, featuring the Nano U1700 (1GHz) CPU under a passive copper heatsink, two DIMM slots that support up to 4GB DDR2-667/533, two SATA ports, one PATA port, and a single PCI slot (obviously meant for a low-profile card).

Before you get the idea that this box might be a good home-theater fit because it integrates VIA's Chrome9 HC3 graphics engine, complete with DVI and VGA ports, know that we found the machine unable to display a 19.2Mbps bit rate high-def MPEG2 from disk, even at full color. A 720p WMV HD stream showed full color but at less than 10 frames per second. Even straight DVD playback couldn't achieve full frame rate. As such, we can't recommend this as a multimedia system, never mind a 3D gaming platform.

For productivity and online apps—say on a secondary home or office cubicle system—the XS29F is a smart, attractive success. This is a simple machine, easy to access on the inside but with almost no internal expansion capability. We had no trouble with the integrated Ethernet (not Gigabit, mind you) connectivity; there are a total of six external USB ports; and having absolute silence (at least until the optical drive hums into operation) is heavenly. ▲

Specs: CPU: VIA Nano U1700; Chipset: VIA VX800; Max memory: 4GB DDR2-667; Ports: 2 SATA, 1 IDE, 6 USB 2.0, 10/100 Ethernet, VGA, DVI; Bays: 1 2.5-inch, 1 slim 5.25-inch external

by William Van Winkle

Logitech G35

Logitech's G35 is a great gaming headset. Just remember that it's *for gaming.* Despite its 20Hz to 20kHz spec, the G35 doesn't have the deep bass response to match our aging but excellent Sony MDR-7 reference cans. Explosions aren't quite as sharp and thunderous, nor are the highs as clear and precise. Imagine the glass shattering or brass cartridges pinging off of concrete. The clarity of these tiny sounds is what creates immersive realism. The G35 has enough clarity to let you identify these sounds, but your head won't snap around because you're confusing the game with reality a few feet away. For $130, though, we wouldn't expect anything more.

So, no, we don't recommend the G35 for audiophile-class music listening. Neither will it satisfy those seeking stunning movie playback. But compared to your average gaming headset, the G35 kicks butt. Logitech uses Dolby Pro Logic II post-processing to have the headset's two speakers emulate 7.1 surround sound. In the last few years, Dolby headphone psychoacoustics have taken a significant leap, and the G35 shows this to excellent advantage. When someone in your game walks up behind you, you actually hear footsteps behind you. Throw something at a wall straight ahead, and you'll swear you're hearing output from a center channel that doesn't exist. Channel separation and clarity are not as precise as discrete speakers, but for the many times when you can't have a true 5.1 or 7.1 setup waking the neighbors, the G35 is a great runner-up.

Logitech throws in a couple of different pads to help accommodate different-sized heads, but we found the standard pad, band adjustment, and cup padding more than comfortable for two to three hours of gameplay. The mic is sufficiently adjustable and does an excellent job at noise cancelation and preserving voice clarity. We also like that volume controls are side-mounted on one ear rather than dangling in-line on the cable. Logitech's drivers feature some very basic EQ, and the ability to customize the application and activity for three side-mounted function buttons (such as play/pause in Winamp or starting Ventrilo) is a handy extra. ▲

by William Van Winkle

G35
$129.99
Logitech
www.logitech.com
● ● ● ●

Specs: Frequency response: 20Hz to 20kHz (headphone), 100Hz to 10kHz (mic); 40mm driver; Interface: USB 2.0

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ● ● ◖ **2.5 = ABSOLUTELY AVERAGE** | ● ● ● ● ● **5 = ABSOLUTELY PERFECT**

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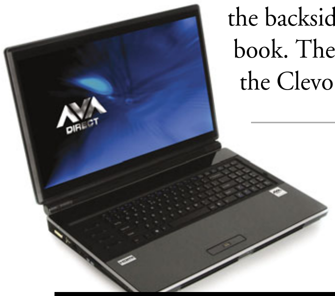
AVA Direct Clevo M980NU Core 2 Gaming Notebook

AVA Direct is serious about its mobile gaming systems, and its largest model, the Clevo M980NU, only serves to confirm the company's commitment. For starters, the Clevo M980NU makes a monstrous first impression, with its domineering size and impeccable consruction. In terms of overall design, the Clevo M980NU has an impressive finish, accented by the mirrored display, backlit fan speed controller, and a touch-based multimedia command panel.

There are three intake fans located on the underbelly of the system, directing heat to the four vents on the backside of the notebook. The bottom of the Clevo M980NU's shell doesn't run parallel to its internal hardware, so there's plenty of room for adequate airflow. On either side of the Clevo M980NU, you'll find an abundance of ports, including three USB 2.0 ports, an eSATA port, four audio jacks, CATV (though a TV tuner card is an optional add-on), IEEE 1394, DVI-out, HDMI, and an MMC/SD/MS card reader. There is a bevy of other features, such as support for up to three 2.5-inch HDDs/SSDs, a responsive touchpad, and a beautiful 18.4-inch display.

If you're keen on something that's comparable to the Alienware M17x, but don't want your laptop to look like an extraterrestrial entity, the Clevo M980NU should fulfill your mobile gaming desires. ▲

by Joanna Safford



Clevo M980NU Core 2 Gaming Notebook
$4,468.35 (as tested) | AVA Direct
www.avadirect.com
● ● ● ●

Specs: CPU: Intel Core 2 Extreme QX9300 @ 2.53GHz; GPU: Nvidia GeForce GTX 280M 1GB GDDR3 (2x, SLI); Display: 18.4 inches (1,920 x 1,080); RAM: 4GB (2x 2GB) PC3-8500 DDR3; Storage: 500GB Seagate Momentus (7,200rpm), 2 Corsair 128GB P128 SSD; Optical Drive: DVD±RW; Windows Vista Ultimate 64-bit SP1; one-year warranty

Benchmark Numbers

PCMark Vantage	
Overall	6961
Memories	5015
TV & Movies	3892
Gaming	8606
Music	4230
Communications	4769
Productivity	12236
Hard Drive	18266
3DMark Vantage (1,280 x 1,024, Performance)	
Overall: P10470	
3DMark GPU Score	8651
GPU1 (fps)	26.89
GPU2 (fps)	23.74
3DMark CPU Score	28340
CPU1 (Plans/s)	1381.45
CPU2 (Plans/s)	101.35
Left 4 Dead	
1,280 x 1,024 (High Quality, 8XAA, 16XAF)	72.83

Chumby Industries Chumby

We've seen Internet-ready fridges come and go. PC desktop widgets seem to have had their day. Just when the "Internet appliance" idea seems to have died, we get the chumby. Can a great UI do for widgets what TiVo's interface did for DVRs?

Physically, the chumby is little more than a plush leather bag stuffed with a 3.5-inch touchscreen, top-mounted Function button, tilt sensor, and a Wi-Fi radio. The back features an AC power port, headphone jack, two USB ports, and a pair of surprisingly acceptable 2W speakers. Internally, chumby runs Adobe Flash Lite apps on a Linux platform.

A chumby can run practically any sort of widget you can imagine, and we tried dozens—everything from Pandora radio to eBay auction tracking. If there's a widget for something on the desktop, odds are good you'll find an equivalent in the 1,200-strong and growing chumby widget catalog. It's a photo frame. It's an alarm clock. It's your put-anywhere RSS feed/YouTube/social networking/sports/weather/eBay auction/Netflix account viewer.

Initial chumby setup requires associating the chumby with your wireless LAN, creating a free account through a regular Web browser, linking the chumby to that account, and selecting some content—a simple, five-minute process. Chumby's only weakness is its lack of battery power, but with limited portability, we kept the chumby in a safe, very visible place rather than letting it wander and get beat up.

After a few weeks of use, the cuteness and novelty wear off. Chumby picks up road wear. (Tip: Buy a dark color.) We found that you'll soon forget about chumby if you use it to try and replicate sites and data you see often on your desktop anyway. But if you can discover content that you don't ordinarily see elsewhere, then chumby delivers it in a fun, addictive fashion. The screen needs occasional recalibration, but otherwise, the device's UI is simple and spot on. There are no additional subscriptions or fees, so you can add channels and chumby away, 24/7. ▲

by William Van Winkle

Chumby
$199.95
Chumby Industries
www.chumby.com
● ● ● ●

Specs: 3.5-inch touchscreen; 2 USB ports; headphone jack; 802.11b/g

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ● ● ◖ 2.5 = ABSOLUTELY AVERAGE | ● ● ● ● ● 5 = ABSOLUTELY PERFECT

Trendnet 300Mbps Concurrent Dual Band Wireless N Router

Dual-band wireless routers, such as Trendnet's TEW-671BR, can work with dual-band receivers to optimize performance and avoid interference issues.

In particular, the ability to use both 2.4GHz and 5GHz is ideal for people who want to split the frequency streams for data transfer and media streaming—or Internet access. Thus, you can avoid bandwidth issues that would ruin video playback over your wireless network. The TEW-671BR is a Draft N router that also supports WMM (Wi-Fi Multimedia) QoS to prioritize packets for video- and audio-based content.

For initial setup, Trendnet provides an excellent configuration wizard that walked us through the SSID, password, and wireless security. But that's where the included users manual and wizard stops. However, the TEW-671BR offers an intuitive interface. For example, to access the QoS settings, we only had to click the Advanced tab and select QoS. You can set Priority delivery for FTP, HTTP, Telnet, SMTP, and POP3. There are also three Priority options for custom port ranges. Trendnet also builds in traditional security options, firewall protection with NAT and SPI, and a host of access restriction controls.

300Mbps Concurrent Dual Band Wireless N Router
$127.99
Trendnet
www.trendnet.com
●●●

To test throughput, we used Net-Stat Live to monitor the transfer of our 500MB test folder to our test PC, which featured Trendnet's TEW-664UB wireless N USB adapter. We saw a sustained throughput of around 56Mbps, with a max of 106Mbps, regardless of radio frequency. The 2.4GHz signal offered a range of around 100 feet, while the 5GHz signal seemed to max out at around 50 feet.

Overall, we felt the 300Mbps Concurrent Dual Band Wireless N Router has a lot to offer for people interested in isolating frequencies for quickly streaming media or transferring files. ▲

Specs: IEEE 802.11a/b/g/n (draft 2.0) with MIMO; Encryption protocols: WEP (64-bit/128-bit), WPA-PSK (TKIP), WPA2-PSK (AES), WPA/WPA2-RADIUS; Dimensions: 1 x 4.4 x 6.7 inches (HxWxD)

by Nathan Lake

Logisys 2.1 + 1 Multimedia Clear Speaker With Blue LEDs

It's not farfetched to believe modders with a fixation for lighting would be interested in casting Logisys' 2.1 speaker set (model SP6006CL) in a supporting role for upcoming builds for reasons having nothing to do with audio. That's not to say the SP6006CL is B-list material where audio is concerned. It's just that the hazy-blue LEDs the system's components emit are impossible to ignore—partially because they don't turn off and partially because they're just cool in a mad-scientist way.

The majority of the SP6006CL's Dr. Frankenstein vibe stems from a 16W passive subwoofer donning a transparent, rounded plastic shell that begs you to run your hands over it in the hope electric sparks will fly. Such wishes will end in disappointment, but the subwoofer did induce occasional periods of hypnotic trance thanks to the flittering LED, which activates from the thuds the sub generates. But this subwoofer isn't just for show. Although a bit underpowered, as evidenced in Red Hot Chili Peppers tracks featuring Flea and Metallica tracks fueled by Cliff Burton, quality is certainly respectable for this price.

SP6006CL 2.1 + 1 Multimedia
$65 | Logisys
www.logisyscomputer.com
●●●

Elsewhere, the SP6006CL's two hefty, softball-shaped 12W satellites follow much in the same footsteps. Although the transparent, LED-flavored speakers tended to lose some warmth, richness, and texture in dense, layered tracks, such as Grizzly Bear's recent "Veckatimest," the speakers were beyond satisfying in outputting strong, clear dialogue in DVD movies and well-rounded, distortion-free music and speech when connected to various PCs/laptops and PMPs.

Beyond magnetically shielding the entire system, Logisys ships the SP6006CL with a standalone amplifier. The amp makes setup a breeze, plus it sports front-located power, bass, treble, and volume knobs.

Add everything up, and the SP6006CL's flattering entry-level performance, LED prowess, and sweet sticker price make it a potential star among modders looking to get noticed. ▲

Specs: 5.25-inch magnetically shielded woofer, 16W RMS; two 2.5-inch magnetically shielded satellites, 12W RMS each; 30Hz-120Hz woofer frequency response; 120Hz-20kHz satellite frequency response; >65dB signal-to-noise ratio; 3.5mm and RCA inputs

by Blaine Flamig

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Enermax Staray

Staray
$70
Enermax
www.enermaxusa.com
●●●

There's something to be said for a solidly constructed case that sports a straightforward layout but manages to mix in some flare at an affordable price. That sums up Enermax's Staray (model ECA3171-BR-AP), a budget-friendly black- and red-tinged midtower that supplies flashes of brilliance as well as plenty of potential for airflow, a tool-less design, and more.

When powered on, three red Enermax-branded Apollish 120mm fans using the company's Twister-bearing technology dominate the steel-constructed Staray's appearance. One fan sits behind the front panel, the others on the lone removable side panel. Beyond integrating 15 circular-patterned LEDs (rated as four times more intense than traditional LEDs according to Enermax), each fan operates in three modes, including a sweet, swirling "lighthouse effect." A convenient front-panel button cycles through the front fan's LED modes, but controlling the side-panel fans' LEDs requires removing the side panel (only a two-thumbscrew task) and using a button attached to each fan. A fourth rear-panel 120/90/80mm fan is optional.

Beyond the front-panel fan, a micro dust filter also sits behind the mesh-covered front panel. (Mesh also covers the side-panel window.) As with many other midtower cases, the Staray's internal drives sit behind the front panel. Although the layout will slightly negate the positives of the mesh and fan, it isn't a bad problem to have considering Enermax provides a whopping seven 3.5-inch and four 5.25-inch bays. Such expandability at this price is a great luxury, and the tool-less twist-and-lock mounting mechanisms to secure drives in place are beyond quick and easy.

Elsewhere, the case is in line with what you'd expect for $70. Noise- and vibration-reducing touches are absent, but you do get mic and headphone jacks up front sitting between two USB ports. There are also two holes for hoses and seven expansion slots complete with a clever, hinged locking system. If three LED fans are overkill, the $55 black and blue-colored ECA3170-BL makes all but the front-panel fan optional. ▲

Specs: Chassis: Steel; Motherboard support: ATX, microATX; Bays: 4 5.25-inch external, 1, 3.5-inch external, 7 3.5-inch internal; Slots: 7; Dimensions: 16.15 x 7.27 x 17.69 inches (HxWxD); PSU optional; Fans: Front: 1 120mm, Side: 2 120mm

by Blaine Flamig

Microsoft Zune HD

Zune HD
$219.99 (16GB Onyx Black); $289.99 (32GB Platinum Silver)
Microsoft | www.zune.net
●●●●

In its battle against the mighty iPod, Microsoft has released two generations of Zunes that failed to impress. With its third generation, Microsoft went back to the drawing board with a little help from Nvidia's Tegra APX 2600 system-on-a-chip. Microsoft scrapped everything about the previous Zune's interfaces and opted for a multitouch OLED display. New goodies include a basic Internet browser (forget Flash) with a surprisingly good on-screen keyboard and apps.

The iPod touch comparisons are obvious, but Microsoft has gone out of its way to distinguish the almost imperceptibly thicker Zune HD: It's noticeably shorter and narrower, and the back is angled like a mansard roof, letting the player lie flat. Previous Zune owners will be glad to know the sync/charge port hasn't changed. Sadly, volume adjustment can only be performed via touch and a minimum of two button presses.

But it's the software that makes the Zune HD shine. Navigating menus on the Zune HD is a visual treat. During audio playback, the screensaver displays song and artist text sliding over images of the artist and album art. It's striking to behold while docked, but the power-sucking feature makes little sense otherwise. With video playback, the Zune HD's OLED screen displays nearly true black, and appropriately encoded video looks amazing. The HD Radio works very similarly to the radio on the previous Zunes but delivers CD-quality FM and access to HD multicast channels. With the latest software update, Zune users can tag radio songs for later purchase. Battery life is leaps and bounds better than on previous players. Currently, the Zune HD's fistful of apps (half a dozen 2D games and Weather and Calculator apps) can't touch that of the iPod, but Microsoft promises more to come.

As is, the Zune HD is the closest the iPod touch has to competent competition. But if Microsoft fills in some of the software holes, then it has a serious chance of slicing into Apple's market share. ▲

Specs: Dimensions: 4.02 x 2.07 x 0.35 inches (HxWxD); Weight: 2.6 ounces; 3.3-inch (480 x 272) multitouch OLED display; 720p output (with optional dock); HD Radio tuner; 802.11b/g

by Andrew Leibman

You know how to build your own PC.

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Anand's Corner

by Anand Lal Shimpi

AMD Is First To DirectX 11

It's called "RV870" and, sometimes, "Cypress," and from a compute standpoint, it's roughly twice as powerful as a Radeon HD 4870.

I'm of course talking about AMD's first DirectX 11 GPU, the Radeon HD 5800 series. There are two cards available, the Radeon HD 5870 and the Radeon HD 5850, and although things may improve by the time you read this, I use the term "available" loosely, as quantities are still scarce as we go to press.

Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today*, CBS' "48 Hours," and* Fortune*. His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.*

Priced at $379 and $259, respectively, these two GPUs primarily increase compute horsepower over their predecessors. They are built on TSMC's 40nm process, the second GPU release from AMD to do so. At 40nm, AMD was able to cram a whopping 2.15 billion transistors into a 334mm2 die. That's bigger than the Radeon HD 4870 was (256mm2) but still smaller than Nvidia's current and next-gen, high-end GPUs.

AMD's basic core is a 5-wide unit. While the 4870 had 160 of these cores, the 5870 has 320. The 5850 has 288. Multiply them out by five if you want to get the equivalent in Nvidia terms (because Nvidia uses a 1-wide scalar architecture), but keep in mind that AMD's architecture won't always be able to extract peak efficiency out of the instruction stream to make each core behave like a 5-wide processor.

The end result is that the Radeon HD 5870 performs similar to if not better than a GeForce GTX 295, Nvidia's current single-card, dual-GPU high-end card. The GTX 295 is more expensive and draws a lot more power, so the 5870 wins there.

The only issue with the 5870 is really its pricing. AMD priced it at $379 because Nvidia currently has no answer to it. Fermi, Nvidia's next-generation GPU architecture, won't be available in a high-end card until 2010. AMD did imply that the 5800 series can drop in price very quickly if need be. That need probably won't come until sometime in the first half of 2010, though, at which point I'd expect AMD to price the 5870 below $300.

The really exciting card is the Radeon HD 5850. It is priced at a fairly reasonable $259 and generally outperforms the GeForce GTX 285, which is currently more expensive. A pair of these in CrossFire very nearly performs on par with a pair of 5870s, but with much better power characteristics and a lower entry price.

AMD isn't done for the year, either; we should see a $199 part in the not-too-distant future. AMD committed to four DX11 GPU releases in six months, so if they haven't yet shipped one at a price you're comfortable with, they most likely will, and it seems likely that they'll do so sooner than Nvidia.

Gaming performance is huge, but there are some other features that AMD is bringing to the table. The first is Eyefinity. Each DX11 GPU supports at least three simultaneous display outputs, and with AMD's drivers, the OS views the three as a single large display (for instance, three 1,920 x 1,200 displays turn into one 5,760 x 1,200 display). Later this year, AMD will launch a six-output version of the 5870 for creating a Matrix-like wall of displays. The beauty of Eyefinity is that the resolution is enumerated just like a standard resolution in Windows, so any game that asks Windows what resolutions are supported can run across three, four, five, or six displays, depending on your card. Your mileage may vary in practice; the technology works very well in games that properly add more pixels to your viewport and horribly in games that just stretch the screen to fit the added resolution. I see potential for the tech, however.

The second feature that has me excited is full bistreaming of Dolby TrueHD and DTS-HD Master Audio. Prior to the 5800 series, you had to buy an expensive sound card to bitstream high-def Blu-ray audio codecs to your receiver, but AMD changes all of that. This is really a high-end HTPC feature, but it's one that is definitely appreciated.

If you're building a Windows 7 box and plan to do any sort of gaming, you now know what graphics card to put in it. ▲

Talk back to Anand at anand@cpumag.com

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Remember the days spent with a pocket full of quarters waiting for your chance to jump into the action at the local arcade? Patriot Memory has teamed up with Capcom to bring the action back! Select Patriot Memory products are bundled with Street Fighter™ IV for the PC (via Steam®). Harness the power of your gaming system to punish your opponents. Relive the memories in glorious high resolution detail with a unique 2D perspective and stylized 3D characters and environment. Street Fighter® IV for the PC is available bundled with the following Patriot Memory products: 32GB Xporter Boost, 128GB Xporter Magnum, 64GB – 256GB Torqx SSD and the new Sector 5 G Series Gaming Memory. **PLAY TO WIN!**

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PC Modder

Tips & Tutorials

Modding does the body good. A PC's body anyway, inside and out. Here you'll find hardware, firmware, tools, tips, and tutorials for modding your rig's performance and appearance. Send us your own mod-related tips and ideas at modding@cpumag.com.

Modding enthusiasts have a penchant for the latest toys. Fast processors, powerful video cards, silent SFF enclosures, and radically lit motherboards are all fair game when it comes to a modder's creative mind. Recognizing the appeal of unconventional customization, an entire industry has emerged to support the community.

Mods & Ends

Enzotech VGA-IS Forged Copper Waterblock

Liquid-cooling enthusiasts searching for a GPU waterblock that will likely last through a few upgrade cycles will be intrigued by Enzotech's new VGA-IS Forged Copper VGA Waterblock ($59.99; www.performance-pcs.com). The VGA-IS comes with either 3/8- or 1/2-inch high-flow hose barbs and hose clamps, along with the requisite installation guide and a tube of high-quality Arctic Silver Céramique thermal grease.

But what's most interesting about the VGA-IS is the inclusion of two different mounting plates, each with two sets of mounting holes. The sleek design of the waterblock itself, in conjunction with the different mounting plates, makes the unit compatible with a broad range of current graphics cards, ranging from Nvidia's GeForce 6800 to the current GTX 200 series and Radeons from the HD 3850 to the 4890. As long as the mounting holes on one of the included mounting plates line up with the holes on your graphics card, the Enzotech VGA-IS Forged Copper VGA Waterblock will probably fit.

Prolimatech Mega Shadow Deluxe Edition

The massive Prolimatech Mega Shadow Deluxe Edition CPU cooler ($78; www.crazypc.com) is the latest in the company's line of Megahalems air coolers. The oversized, tower-type heatsink is outfitted with a heavy, copper base; six 6mm U-shaped copper heatpipes; and two stacks of 44 aluminum heatsink fins, designed to minimize air resistance and maximize surface area. The entire unit, including the base, is plated in black nickel to minimize thermal resistance.

The gargantuan Prolimatech Mega Shadow Deluxe Edition CPU cooler sports black nickel-plating and six U-shaped 6mm heatpipes.

The Mega Shadow Deluxe Edition includes mounting hardware for Intel Socket 775, 1366, and 1156 processors and ships with two sets of fan clips to accommodate a 120 x 25mm fan. (Clips to mount a 120 x 38mm fan are sold separately.) A fan isn't included, however, so you'll have to procure your own.

Arctic Cooling Accelero Xtreme 4870X2

AMD's stock ATI Radeon HD 4870 X2 cooler did a decent job at keeping the card's dual onboard GPUs relatively cool. But the stock cooler could get somewhat loud when the card was under load, and its cooling fan was spinning at a high speed.

ATI Radeon HD 4870 X2 owners looking to quiet down their cards, while also enhancing their cooling performance, should check out the Arctic Cooling Accelero Xtreme 4870X2 tri-fan cooler.

Enter the Arctic Cooling Accelero Xtreme 4870X2 ($78.90; www.arctic-cooling.com). This bolt-on replacement for the stock AMD cooler features three 92mm fans that can churn out up to 81cfm of airflow. Its large heatsinks are linked together by eight heatpipes. Best of all, the Accelero Xtreme 4870X2 does its job quietly, producing a sound level of only about 20dB.

Fashionably Fresh Firmware

QNAP NMP-1000 (v1.1.1)

The latest update for the QNAP NMP-1000 network multimedia player adds UPnP media player support as well as support for direct downloads of YouTube and Flickr videos and Apple movie trailers. The new firmware also bolsters Flickr slideshow compatibility and fixes a wireless network bug when uploading large files to an NFS/FTP server (among others).

www.qnap.com

D-Link DIR-685 (v1.01NA)

An update for the D-Link DIR-685 Xtreme N Storage Router disables graphic authentication and fixes an auto-refresh and PPPoE disconnect bugs.

www.dlink.com

Intel X25-M / X18-M 34nm G2 (v02G9)

A firmware update for the Intel X25-M and X18-M solid-state drives fixes a bug that caused some systems to hang when a BIOS-level drive password was enabled and resolves a related issue that caused some systems to be unusable when the BIOS-level drive password was disabled or changed.

www.intel.com

by Marco Chiappetta

Core i7 Memory Overclocking

Maximize Memory Performance With Intel's Flagship Processor

When Intel introduced its flagship Core i7 line of desktop processors in late 2008, the chips were universally praised by most enthusiasts and analysts for their excellent performance and cutting-edge technologies, such as Turbo Mode, advanced power management, QPI, and an integrated triple-channel DDR3 memory controller. All of these features, in addition to revamped execution cores and old standbys such as HyperThreading, culminated in a desktop processor that outperformed Intel's previous generation at nearly every turn and left AMD's Phenom II in the dust.

Although the Core i7's performance is unquestionably enticing to many enthusiasts, the new technologies employed in the chips require some re-education, for lack of a better word. Prior to the official launch of the processors, rumors swirled that overclocking would be difficult with the Core i7. You see, with the Core i7, Intel eliminated the FSB that had been used in Intel processors for decades. And without an FSB speed to alter, overclocking the chips would require some new techniques. Integrating a memory controller onto the processor die meant there would be a few additional subtleties to consider with regard to memory tweaking. And the initial batch of engineering sample processors used by analysts had locked memory controller multipliers that fueled speculation that fine-tuned memory overclocking wouldn't be possible. Thankfully, that didn't turn out to be the case—quite the contrary. Core i7 processors turned out to be excellent overclockers, and with retail-ready chips, manipulating the memory multiplier was possible because the chips weren't locked.

Still, the tried-and-true methods for overclocking the Core 2 and Pentium processors of the past were no more. So enthusiasts had to figure out the new, correct ways to wring extra performance from their Core i7-based systems. We detailed the steps necessary to overclock a Core i7-920 a few months ago (see page 52 in the March 2009 issue) but have decided to dive a little deeper in this issue and focus specifically on memory overclocking with the Core i7.

Although memory overclocking with the Core i7 is fairly straightforward, there are some nuances to consider to ensure peak performance and long-term system reliability. But fear not—we have the full scoop.

Crucial Considerations

The IMC (integrated memory controller) incorporated into current Core i7 processors allows for relatively low-latency access to system memory and theoretical peak bandwidth well above any other desktop CPU. It does, however, require a specific configuration to attain optimal performance. For one, a triple-channel memory configuration consisting of three matched DIMMs is a necessity. And said memory must operate at a voltage no higher than 1.65V. That usually means buying a new memory kit specifically designed for the Core i7 for most users; memory left over or transplanted from older system builds is not likely to be matched nor operate at only 1.65V. It's Intel that recommends 1.65V, which suggests that pumping more than

To attain peak performance with Intel's Core i7 platform, a low-voltage, triple-channel DDR3 memory kit is an absolute must. We'd also recommend a kit with a rated frequency of at least 1,333MHz to wring a bit of extra performance from the system.

1.65V into a Core i7's IMC would shorten the life of the processor.

Another thing to note with regard to the Core i7 and memory is that Socket 1366, Bloomfield-based processors officially support a triple-channel memory speed of only 1,066MHz (newer Lynnfield-based Core i7-800 series processors officially support memory speeds of up to 1,333MHz, in a dual-channel setup). That means running the memory at any speed over 1,066MHz can be considered overclocking. Although 1,066MHz, triple-channel memory configurations on the Core i7 offer peak bandwidth that's superior to other desktop CPU platforms, running the memory at higher speeds delivers significantly more bandwidth.

Performance: Which Core i7 Memory Configuration Is Best?

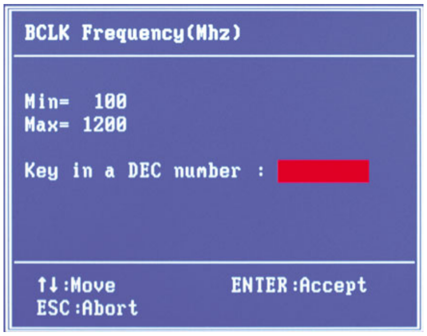
To determine the impact that altering the memory frequency had on an Intel Core i7-965-based system's performance, we conducted a number of tests in which we changed the memory frequency in a few different ways. We configured the memory frequency by either increasing the memory multiplier or raising the base clock separately before finally altering both settings in tandem. In addition to the aforementioned Core i7-965 processor, our test system consisted of a Gigabyte GA-EX58-UD5 motherboard, 6GB (3x 2GB) of 1.65V OCZ Reaper DDR3-1866 RAM, an AMD ATI Radeon HD 5870, and a WD Raptor 150GB hard drive, all running under Windows 7 Ultimate x64 Edition.

We ran benchmarks on the system with its memory frequency running at speeds ranging from 1,066MHz (the officially supported, stock memory frequency on Socket 1366 Core i7-based systems) to 1,866MHz. Throughout all of the tests, we made an effort to keep the CPU core clock as close to the Core i7-965's stock speed of 3.2GHz as possible. This is easily done when you only change the memory multiplier but more difficult once you alter the base clock frequency, hence the slight variations in the CPU clock frequency in a couple of the tests.

As you would expect, raising the memory frequency on a Core i7-based system resulted in significantly increased peak bandwidth. The initial baseline tests run with the memory operating at 1,066MHz resulted in peak bandwidth of about 20GBps, as reported by SiSoft Sandra. With each incremental increase in the memory speed, though, total bandwidth also went up, peaking at just over the 31GBps mark. Increased memory speeds also resulted in lower memory latency and higher frame rates in the low-resolution Crysis CPU benchmark.

Ultimately, as is the case with many PC mods, we achieved the best performance by striking a balance between base clock and memory multiplier manipulation, which results in increased memory and uncore speeds. With more peak bandwidth and faster-running uncore processor elements, performance increased across the board, without sacrificing stability or pumping too much voltage into the CPU.

						SiSoft Sandra 2009 SP4a				Crysis
	Base Clock	CPU Multiplier	Memory Multiplier	QPI Speed (GTps)	CPU Clock	Aggregate Memory Performance (GBps)	Integer Buffered iSSE2 (GBps)	Floating Point Buffered iSSE2 (GBps)	Memory Latency (ns)	CPU Benchmark (800 x 600, Low Quality)
Multiplier Manipulation										
DDR3-1066	133MHz	24X	8X	6.4	3.2GHz	20	20.14	20	70	203.51
DDR3-1333	133MHz	24X	10X	6.4	3.2GHz	24	24	24	64	210.98
DDR3-1600	133MHz	24X	12X	6.4	3.2GHz	26.7	26.6	26.8	63	215.77
DDR3-1866	133MHz	24X	14X	6.4	3.2GHz	30.8	30.7	31	56	221.39
Base Clock Manipulation										
DDR3-1333	166MHz	19X	8X	6	3.16GHz	24.8	24.71	24.9	60	220.26
DDR3-1600	200MHz	16X	8X	7.2	3.2GHz	28.1	28	28.24	60	226.21
Multiplier & Base Clock Manipulation										
DDR3-1600	160MHz	20X	10X	5.76	3.2GHz	28.16	18.1	28.22	60	224.81
DDR3-1866	187MHz	17X	10X	6.73	3.17GHz	31.37	31.27	31.47	55	233.53



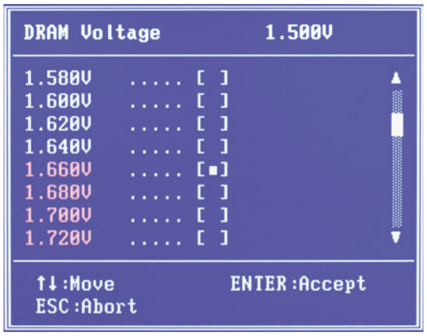
```
BCLK Frequency(Mhz)

Min=  100
Max= 1200

Key in a DEC number :

↑↓:Move          ENTER:Accept
ESC:Abort
```

Clock speeds for many aspects of a Core i7-based system are derived from a single base clock, which runs at 133MHz by default. The QPI link speed, and memory controller, other uncore elements, and processor core frequencies are all determined using some multiple of the base clock. And raising the base clock frequency also increases the speed of all of these other elements.

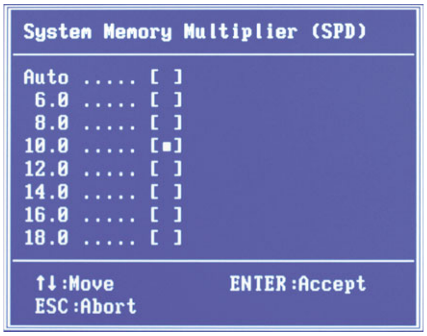


```
DRAM Voltage            1.500V

1.500V    ..... [ ]
1.600V    ..... [ ]
1.620V    ..... [ ]
1.640V    ..... [ ]
1.660V    ..... [■]
1.680V    ..... [ ]
1.700V    ..... [ ]
1.720V    ..... [ ]

↑↓:Move          ENTER:Accept
ESC:Abort
```

The integrated memory controller incorporated into current Core i7 processors is sensitive to voltages higher than 1.65V. Although many motherboards will allow you to tweak voltages beyond 1.65V, prolonged use at higher settings will shorten the life span of the processor. It's nearly impossible to say exactly, but be aware that high memory voltages and the Core i7 don't mix well.



```
System Memory Multiplier (SPD)

Auto ..... [ ]
 6.0 ..... [ ]
 8.0 ..... [ ]
10.0 ..... [■]
12.0 ..... [ ]
14.0 ..... [ ]
16.0 ..... [ ]
18.0 ..... [ ]

↑↓:Move          ENTER:Accept
ESC:Abort
```

Virtually all enthusiast-friendly, X58 Express-based Core i7-compatible motherboards give users the ability to manually alter the memory multiplier without affecting the clock speed of the CPU itself. Doing so can result in a higher memory frequency, and hence more peak memory bandwidth, which will increase performance in some situations.

We'd also like to point out that newer revisions of the Core i7 featuring the D0 stepping are more forgiving than the original processors that shipped at launch, which featured a stepping of C0. Intel doesn't disclose exactly what changes it made from stepping to stepping with the processors, but you can bet that it eliminated some errata. Testing has shown D0-based chips to overclock better and operate more reliably with faster memory speeds. If you got your Core i7 when they were first released, it is likely a C0-based chip, but anything recently bought new or in the last few months will be based on the D0 revision.

Turn The Knobs

Overclocking the memory in a Core i7-based system can be done by either altering the memory multiplier, raising the reference base clock speed, or using some combination of the two methods.

The operating frequencies of many aspects of a Core i7-based system are derived from a single BCLK (base clock) speed, which runs at 133MHz by default. Some like to think of the base clock as an equivalent to the FSB speed, but that's not the case. Core i7 systems no longer have an FSB; the base clock is simply a reference point by which other CPU and system components derive their frequency. For example, by default, a Core i7-based system's memory will operate with an 8X multiplier; 8 x 133.3MHz = 1,066MHz, which is the officially supported memory speed for Core i7 processors. Raise either the multiplier or the base clock speed, and the memory will operate at a higher frequency.

Raising the memory multiplier is the easiest method. Simply enter the system BIOS on the motherboard and head into the overclocking related submenu. Here, you should find a setting for DRAM speed that will offer multipliers ranging from 8X to potentially 18X. Because Socket 1366 Core i7s must be pared with Intel's high-end X58 Express, virtually all Core i7-compatible motherboards will have a multiplier. Raising the multiplier to 10X will result in a memory speed of 1,333MHz; 12X produces 1,600MHz, and so on.

Increasing the base clock frequency will also result in faster memory speeds, but there's a catch. Increasing the base clock frequency will also overclock other aspects of a Core i7-based system. The execution cores in the CPU itself operate at some multiple of the base clock, as do the other uncore elements. (Intel collectively refers to all of the elements within the Core i7's processor die that are not computing engines—e.g cache, QPI links, etc.—as uncore elements.) So, increasing the base clock speed too aggressively without also altering other uncore-related multipliers could result in instability unrelated to memory if some other elements of the chip are running too far out of spec.

Finding the right balance between memory multiplier manipulation and base clock frequency with your particular CPU and components will typically offer the best overall performance, as you'll see in the sidebar.

Bodacious Bandwidth

Our testing showed that increasing the base clock speed, and hence the uncore frequency, while simultaneously increasing the memory multiplier, could result in bandwidth gains in excess of 55%. And we only tested at memory frequencies as high as 1,866MHz; 1.65V, Core i7-compatible memory kits are now available with rated speeds as high as 2,133MHz. With the right combination of hardware and a little tweaking, you should be able to significantly enhance the performance of a Core i7-based system with little more than a few changes in the BIOS. Obviously, the Core i7 is already ultra-fast, but putting in the time necessary to find the maximum memory frequency of your system could make it ultra-faster. ▲

by Marco Chiappetta

Mad Reader MOD

Neptune's Trident

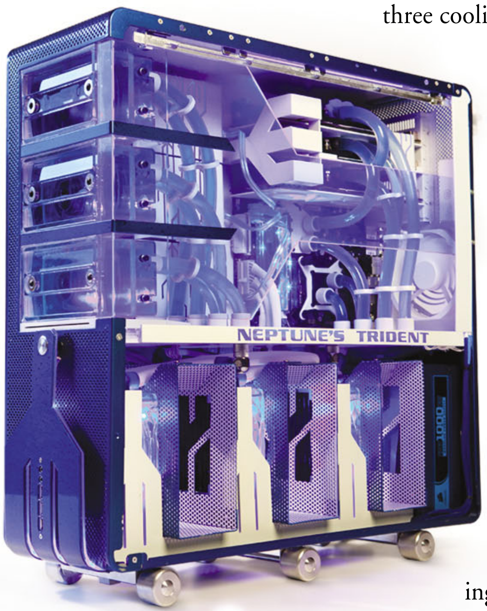
We had a sneaking suspicion after Brian "Bodдaker" Carter's "Battlestar Galactica" mod won the "Mad Reader Mod" award in our April 2009 issue (see page 44) that we'd be seeing more of Mr. Carter, and as it turns out, we were right. In addition to participating in Nvidia, Modders-Inc.com, and CPU's ION Case Mod Contest (stay tuned for a look at all the mods in an upcoming issue!), Carter frequents many of the same LANs that we do, including the Intel LAN Fest event at PAX in September.

Carter calls it "Neptune's Trident," and it's easy to see why: Every inch of this rig, from top to bottom, inside and out, serves the theme. Neptune was the Roman god of the sea, and in addition to being liquid-cooled and having a color scheme of dark and light blues that evokes a sort of aquatic feel, the outer finish of the case (as well as the monitor and keyboard) has an amazing water-drop effect that makes it look as though there are drops of water standing on the blue paint. There's a lot to like about this case, but the water-drop thing is one of the coolest, most unique things we've seen done with paint on a PC case—or any other medium.

The other aspect of the design is the number 3, which of course is the number of tines on a trident. Carter built Neptune's Trident with a 3GHz Intel QX6850 CPU, DDR3 memory (a 4GB Crucial Ballistix Tracer kit), three Evga GeForce GTX 260 video cards, three Samsung 1TB hard drives, and three cooling loops, consisting of three brand-new PrimoChill Typhoon III pump/reservoir systems (provided by Carter's sponsor, Moddersmart), three Swiftech blocks, and three Hardware Labs 120mm radiators. Carter even chose an IZ3D 22-inch 3D monitor to go with the build.

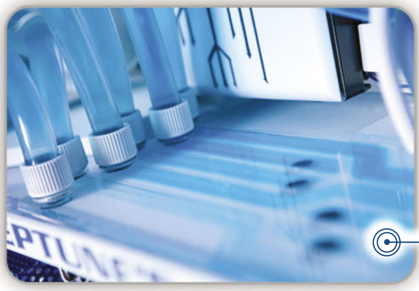
Of course, having an interesting theme is only the beginning. Carter put many hours of painstaking work into gutting and reconfiguring the Lian Li V2000 case to suit his needs, building custom hard drive covers, video card covers, fan grilles, and front and back cover panels for the motherboard so that he could conceal the vast majority of the cabling.

There's more custom work here than we have room to talk about; suffice it to say that this is one of the most amazing, most polished mods we have ever seen. ▲

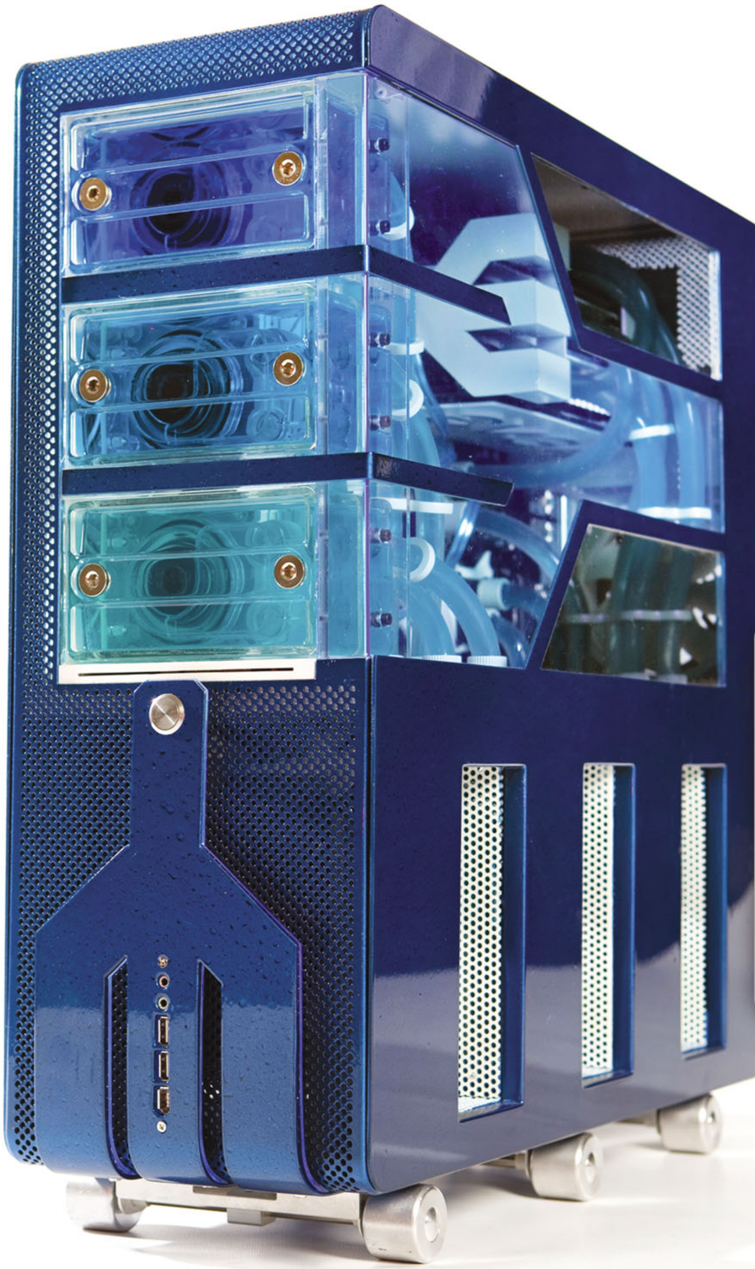


With its side panel removed, the number 3 really jumps out at you. Carter used three of just about everything in this rig.

This close-up shot of Carter's custom front-panel accent (complete with I/O port insets and power button) shows the amazing result of the water-drop effect that adorns the outer surfaces of Neptune's Trident.

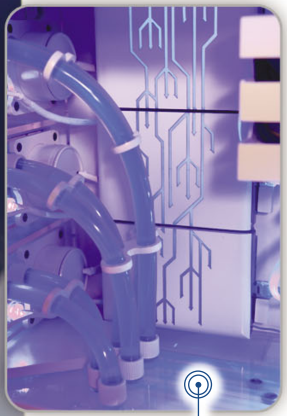


You want insane attention to detail? How about this: Each of the three cooling loops contains coolant with a slightly different shade of blue, arranged in order from lightest to darkest. The custom interior panel that separates the motherboard and drives from the radiators, fans, and power supply also contains three channels for the coolant to run through.



Give Us Your Mod

Have a computer mod that will bring tears to our eyes? Email photos and a description to madreadermod@cpumag.com. We're looking for rigs that are recognizable as PCs; your Wookiee mod won't find a home here. If we include your system in our "Mad Reader Mod" section, we'll help you load up your modder's toolbox with $1,500 and a one-year subscription to *CPU*.



These custom-fabbed hard drive covers (complete with cascading tridents) continue the system's theme as well as Carter's borderline OCD-level attention to detail.

advanced Q&A corner

Get informed answers to your advanced technical questions from *CPU*. Send your questions along with a phone and/or fax number, so we can call you if necessary, to q&a@cpumag.com. Please include all pertinent system information.

Each month, we dig deep into the CPU *mailbag in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable?* CPU's *"Advanced Q&A Corner" is here for you.*

Nina K. asked: **Hi, I wonder if you can help me. I have a genetic disorder called Ehlers-Danlos Syndrome (aka China Doll Syndrome). Typing is causing me all sorts of pains, which are becoming chronic. I bought a Dragon NaturallySpeaking device that allows me to get some work done using voice input, but I also need a keyboard that I don't need to apply too much pressure to make the keys work. I'd like it to be a split, ergonomic keyboard, also.**

Could you please help me out and recommend something for me? I'm not having much luck researching on my own, and this pain is driving me crazy.

A: We're sorry to hear that you have to contend with these issues, Nina; we wish you the best of luck. We think we may be able to help out, but before we say anything, we'd recommend checking in with your doctor first. We'd hate to suggest a product and not have it help you out or, worse, exacerbate your issues.

With that said, we'd suggest looking for a quality, mechanical key switch-based keyboard. Specifically, we think the switch type that would likely work best for you is the Cherry MX Brown key switch. Cherry MX Brown switches require a very light touch in comparison to most other key switches. They aren't "clicky," so you won't have to deal with any unwanted noise, and they are tactile switches, which could make you a better typist. Once you are used to feeling the tactile bump in a switch like the Cherry MX Brown, you'll be less likely to bottom-out the keyboard keys, which should result in less finger fatigue.

Finding ergonomic keyboards based on the Cherry MX Brown switch type can be somewhat difficult, however. Most keyboards use low-quality rubber membranes that are mushy and inconsistent in terms of force and actuation. After doing a little digging, though, we found a company called Kinesis that does offer one ergonomic, mechanical key switch-based keyboard called the Kinesis Advantage (www.kinesis-ergo.com/advantage.htm).

The Kinesis Advantage is one of the few ergonomic keyboards on the market that uses high-quality mechanical key switches.

> "The trick to good gaming on the go is definitely a combination of balanced computing, though obviously the focus should be on the GPU if you're a hardcore LAN gamer type."

The Kinesis Advantage is not without its drawbacks, though. For one, it's very expensive, retailing for $299 on Kinesis' site. It also has a funky layout that lacks a numeric keypad. (But it may work well once you're accustomed to it.)

As an aside, putting a cushioned mat under your keyboard will help absorb the force that's transmitted into your fingers when a key is bottomed out. We know it has helped many users suffering from repetitive stress injuries; it may work for you, too.

Slingbait asked: **I'm interested in picking up a big notebook that I can take anywhere for gaming, with relative ease. I'm not as concerned with size and weight, since it's not likely I'll be traveling too far with it (to a friend's house or LAN party). Something of the huge 17-inch [display] variety and that opens up a lot of options hardware-wise is what I'm after.**

My dilemma is that I'm not sure if I should invest more money, power consumption, and heat generation into the CPU or go hog wild with the most outrageous GPU—maybe two of them—I can stick in there. What might be a happy balance? I hear Core i7s are coming to notebooks. Should I wait and go for one of those, or will the good ol' Core 2 Duo cut it for me so long as I have enough graphics muscle?

A: The trick to good gaming on the go is definitely a combination of balanced computing, though obviously the focus should be on the GPU if you're a hardcore LAN gamer type. However, there are always caveats, and if you're thinking of going dual-GPU, then you're going to have to make sure your CPU is a littler beefier, as well. Intel's new Core i7 Mobile processor certainly would be a big step up in this latter case, but, honestly, we think a solid, high-end Core 2 Duo or Core 2 Quad will do the trick well enough.

For example, a few gaming notebook manufacturers have really nice 17-inch WUXGA (1,920 x 1,200 resolution) models out now that can be equipped with chips up to the 2.53GHz Core 2 Extreme QX9300. This CPU would hold up really well, feeding even the hungriest of GPUs under high-resolution gaming conditions. Even some of the lower-end Intel Q9000 series mobile quad cores would handle most notebook gaming requirements. You might want to outfit the machine with a beefier CPU if you plan to run a multi-GPU setup, because there will be more system overhead processing inter-GPU transactions.

Speaking of which, on the GPU side of things, these days, the Green Team has the performance advantage with their GeForce GTX 280M and GeForce GTX 260M graphics processors. Nvidia's top dog GTX 280M has 128 stream processor cores and is configured with 1GB of DDR3 memory. A pair of these in SLI would definitely offer mobile gaming bliss in virtually all of the latest game engines, if you can find a machine that supports this setup. One model you could take a look at is Alienware's (www.alienware.com) recently released M17x.

Alienware's M17x gaming notebook is a beast of a machine that allows for both an Intel Core 2 Extreme QX9300 quad-core processor and dual GeForce GTX 280M SLI graphics.

This machine can be configured with a pair of GeForce GTX 280 GPUs, each with 1GB of RAM. We've tested this machine at 1,920 x 1,200 with antialiasing and anisotropic filtering cranked up. (See page 37 in the October 2009 issue.) We had silky-smooth, playable frame rates in top titles such as Left 4 Dead. Another nice feature is that the machine allows for a switchable graphics mode called BinaryGFX, which essentially lets you switch between onboard graphics and the GTX 280M GPUs or power down the GPUs all together, if you need to conserve some battery life for this hungry monster gaming notebook.

There are plenty of other options out there, such as machines from boutique builders such as Sager (www.sagernotebook.com) and Maingear (www.maingear.com), as well. Regardless of what you decide, good luck and have fun! ▲

by Dave Altavilla and Marco Chiappetta, the experts over at HotHardware.com.

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X-Ray Vision: Radeon HD 5800

ATI Introduces DirectX 11 Support

Being first to the market with a desirable feature or product doesn't absolutely guarantee success . . . but it sure doesn't hurt, either.

ATI, the graphics division of AMD, is banking on that philosophy with its recent release of the Radeon HD 5800 series of GPUs, code-named "Cypress" and "RV870." The 5800 series, which initially includes the 5850 and 5870 chips, is the first GPU to provide support for the upcoming DirectX 11 release.

TeraScale 2 Architecture

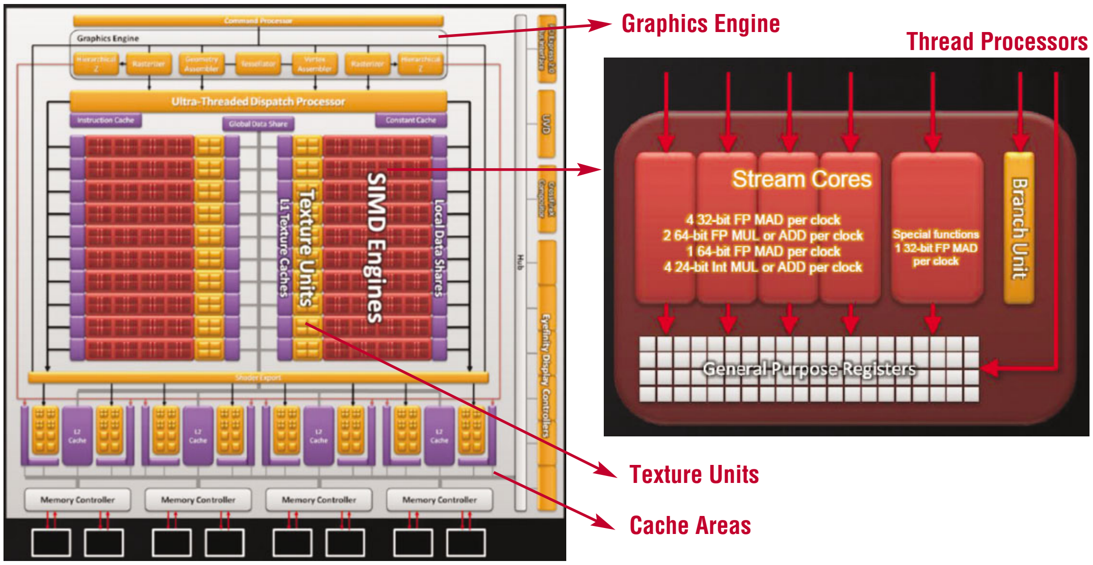
ATI has constructed the HD 5870 GPU with what it calls TeraScale 2 architecture, containing a variety of new features. Here are some of the highlights.

Graphics engine. A new tessellation unit in the graphics engine contains a new algorithm that reduces artifacts. It also can be programmed through DirectX11 hull and domain shaders.

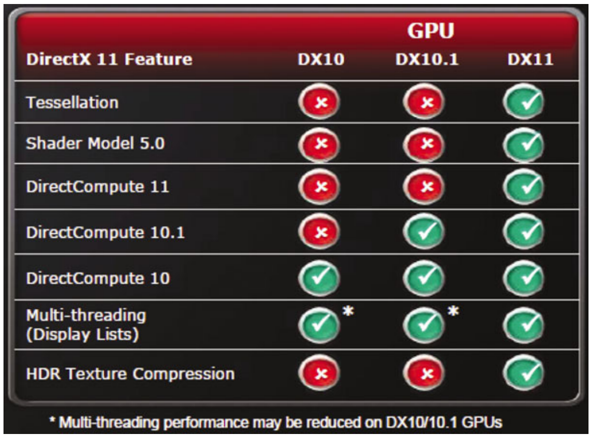
Thread processors. Each of the 20 SIMD engines contains 16 thread processors. Each thread processor includes four stream cores, one special function stream core, a branch unit, and general purpose registers.

Texture units and caches. Several improvements vs. previous architectures have occurred in this area. Texture bandwidth is now as much as 272 billion 32-bit fetches per second. Cache bandwidth is as much as 1TB per second of L1 texture fetch bandwidth, while the bandwidth between L1 and L2 is as much as 435GBps. L2 cache now is 128KB per memory controller. ▲

Source: ATI



DirectX 11 Overview



DirectX 11 Feature	GPU DX10	GPU DX10.1	GPU DX11
Tessellation	✗	✗	✓
Shader Model 5.0	✗	✗	✓
DirectCompute 11	✗	✗	✓
DirectCompute 10.1	✗	✓	✓
DirectCompute 10	✓	✓	✓
Multi-threading (Display Lists)	✓*	✓*	✓
HDR Texture Compression	✗	✗	✓

* Multi-threading performance may be reduced on DX10/10.1 GPUs

The Radeon HD 5800 series will support DirectX 11, with that announcement coming even before DX11 was released.

The DX11 runtime will support all DX10 and newer hardware, and it will work with both Windows 7 and Windows Vista (as long as the Vista update has been downloaded).

Only those GPUs that include full DX11 support, such as Radeon 5800, will have access to the improved multithreading features and DirectCompute 11 found in DX11.

DX10 and DX10.1 GPUs will only be able to access a portion of DX11 functionality.

"From a hardware point of view, it's an all or nothing kind of thing," Baumann says. "You'll get better use of your CPU and a more efficient GPU, too. It will provide both a performance gain and an image quality benefit."

Battleforge had a DX11 patch released before DirectX 11 itself was released. "That's how quickly this transition is going," Baumann says. ▲

Source: ATI

"Every time Microsoft comes out with an API, it's a major point in the market," says ATI's Dave Baumann, a Radeon HD 5800 product manager. "Whoever gets into the next DirectX first generally gets a very healthy segment of the market. It will translate into more realistic gameplay for the end user and faster performance."

Don't make the mistake of assuming that ATI is relying solely on DirectX 11 support to make the 5800 series a success, however; the Radeon HD 5800 has plenty of other features aimed at gamers and enthusiasts.

The Goods

The list of features ATI has built into the Radeon HD 5800 series, which made use of a 40nm manufacturing process, includes:

DirectX 11 support. By building full DX11 hardware and software support into Radeon 5800, ATI had DX11 support available before the DX11 retail edition was released. At the same time, games using DX9, DX10, and DX10.1 should all run smoothly at high resolutions.

OpenCL 1.0. Radeon HD 5800 includes a full implementation of OpenCL 1.0, along with DirectCompute 11.

Doubled processing power. Radeon HD 5800 will offer twice the processing power of the previous-generation GPU while making use of a similar power requirement.

Eyefinity technology. This ATI technology provides image-quality improvements, eventually allowing up to six screens to be operated from one graphics card.

2.15 billion transistors. Along with 2.7 trillion FLOPS (floating-point operations per second), ATI says the processing power in one Radeon 5800-series chip is equal to that found in 177 of IBM's original Deep Blue computers—the same Deep Blue that beat Garry Kasparov at chess in 1997.

5800 + 7 = Win

ATI's Radeon 5850 graphics card will cost $259, while the Radeon 5870's initial cost is $379. The new GPU architecture is the first for ATI in nearly 15 months.

With the scheduled launches of DX11 and Windows 7 in the final quarter of 2009, Baumann says the Radeon 5800 series does a good job taking advantage of those products' new technologies.

"These are launching in a perfect time frame for the Windows 7 launch," Baumann says. "Windows 7 itself improves gaming performance . . . up to a 30% increase, just from the OS alone." ▲

by Kyle Schurman

ATI Eyefinity Technology

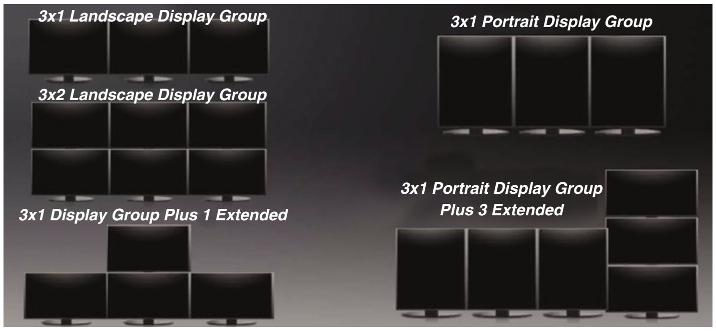
ATI's Eyefinity technology, which is built into the Radeon 5800 series, allows for multiple displays from one graphics card. Initially upon release, Radeon 5800 supported three displays, but six-display support per card was scheduled to appear a few months after Radeon 5800's release. The user can select from a variety of configurations, depending on the output capabilities of his graphics card, as shown at right.

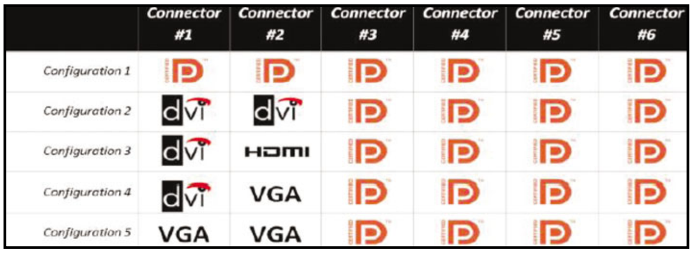
"The immediate application for this type of configuration is gaming," Baumann says. "It changes the way you interact with the game. We call it an unfair advantage, and it kind of is with a multiplayer game."

You can choose to run the displays as a single unit, with the single image stretching across all of the panels, such as is shown in the 3x1 Landscape, 3x1 Portrait, and 3x2 Landscape examples above. (A 3x1 Portrait configuration with an image is shown to the right.) You can choose to have each display show a unique image, allowing you to multitask, or you can combine both techniques, such as would work with the 3x1 Plus 1 and 3x1 Plus 3 configurations above.

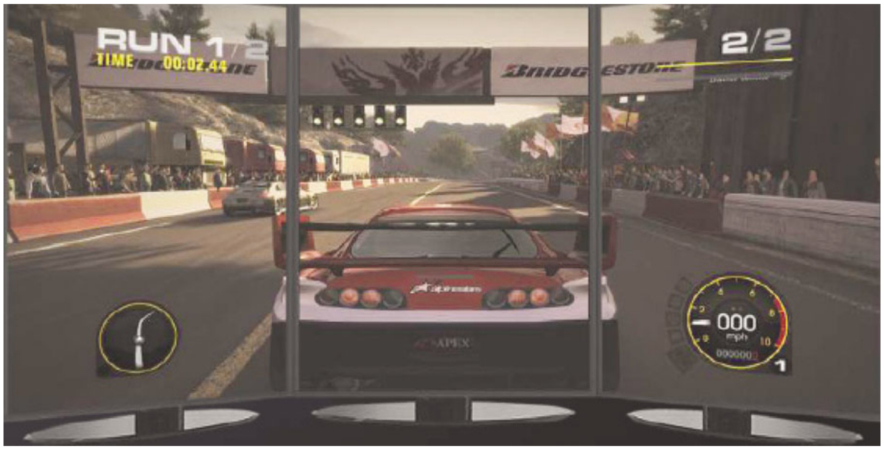
"This wouldn't be possible without DP (DisplayPort)," Baumann says. "It's a very flexible configuration. You can set up your computing environment as you wish." ▲

Source: ATI


3x1 Landscape Display Group
3x1 Portrait Display Group
3x2 Landscape Display Group
3x1 Portrait Display Group Plus 3 Extended
3x1 Display Group Plus 1 Extended



	Connector #1	Connector #2	Connector #3	Connector #4	Connector #5	Connector #6
Configuration 1	DP	DP	DP	DP	DP	DP
Configuration 2	dvi	dvi	DP	DP	DP	DP
Configuration 3	dvi	HDMI	DP	DP	DP	DP
Configuration 4	dvi	VGA	DP	DP	DP	DP
Configuration 5	VGA	VGA	DP	DP	DP	DP



White Paper: Intel P55

Shrinking From Two Chips To One

A few deep-thinking, philosophical questions have challenged humanity for many generations.

If a tree falls in the woods and no one is there to hear it, does it make a sound? Which came first: the chicken or the egg? If the universe contains all known matter and is constantly expanding, what is it expanding into?

You now can add one more to the list: If a chipset contains only one chip, is it still a chipset?

Intel's latest chipset release, the P55 Express chipset, has sparked the latest philosophical riddle, as Intel has removed one of the chips in the chipset, shifting some of the work of the missing chip to the CPU.

New Platform

Intel announced its new platform, consisting of three Lynnfield processors (Core i7-870, Core i7-860, and Core i5-750), several new motherboards, and the P55 Express chipset, in September. The P55 Express chipset received a code name of Ibex Peak during development.

With the introduction of the first of the Nehalem family of processors late in 2008, Intel began shifting some of the features that traditionally have been part of the chipset into the processor, such as the memory controller.

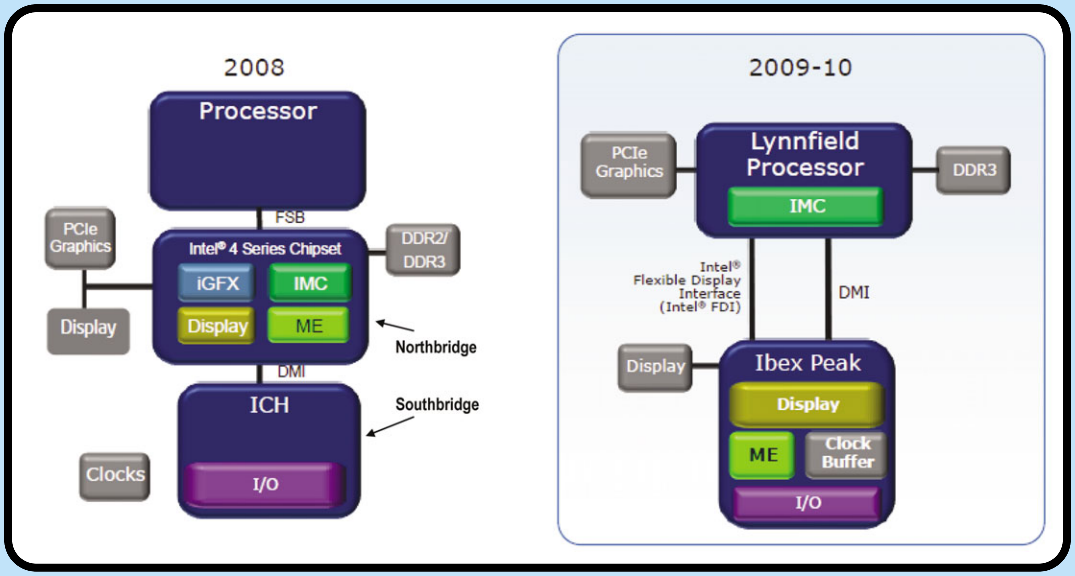
"We're getting things requiring higher bandwidth into the processor socket," says Ronak Singhal, Intel's Nehalem

When One Chip Is Better Than Two

Intel's new P55 Express chipset (right) is a one-chip chipset vs. the two-chip chipsets of the past (left). The P55 Express replaces the P45 chipset, which contained an ICH10R southbridge. (Ibex Peak is the code name for the P55 Express chipset.)

The P55 Express chipset's I/O controller is integrated with the clock buffer, which lowers power consumption. Intel has linked the P55 Express with the processor using a 2GBps DMI (Desktop Management Interface) interconnect. It's similar to the interconnects used between the northbridge and southbridge in past chipset configurations (as marked by DMI in the drawing on the left).

The Lynnfield processors contain integrated memory controllers, allowing for two DDR3 memory channels with clock speeds up to 1,333MHz. Lynnfield, which is the latest version of the Nehalem processor, also contains 16 lanes of PCI-E 2.0 connectivity. With Lynnfield, Intel offers a couple of PCI-E configurations—a single 16-lane configuration at 16GBps or a pair of 8-lane configurations, each at 8GBps. The latter configuration is called FDI (Flexible Display Interface), and it facilitates multi-GPU setups. The FDI channel displays data from the integrated graphics core in Lynnfield to the chipset's display controller. The movement of PCI-E from the northbridge in the prior platforms to the Lynnfield processor in the P55 Express chipset configuration greatly simplifies the overall platform, which should reduce costs for motherboard manufacturers (and, hopefully, consumers). ▲



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family performance architect. "It provides better performance and more efficient power management."

The introduction of the single-chip P55 Express chipset continues that shift of responsibilities, working with Intel's Lynnfield processors. Such shifting continues to improve the system's adaptability.

The P55 Express chipset supports the following:

- 8 PCI-E 2.0 x1 ports
- 6 SATA 3Gbps ports
- 14 USB 2.0 ports
- Gigabit Ethernet
- Intel HD Audio

As mentioned earlier, the biggest change represented in the P55 Express chipset is the move from a two-chip to a single-chip design. Essentially, the P55 Express eliminates the traditional chipset's northbridge; many of the northbridge's responsibilities are shifted to the processor.

However, the P55 Express and Lynnfield architectures represent far more than a simple shift of responsibilities.

"In this architecture, it's revolutionary for i86," says Tony Gallo, Intel's product marketing engineer for desktop chipsets. "It's not simply an import of the northbridge into the CPU. There's a lot more behind it."

Power Savings

By reducing the number of chips in the chipset, Intel has reduced the amount of power required to run the overall system. Intel estimates the power requirement at idle for P55 Express is about 50% less than previous chipsets.

"When you go from three chips [northbridge, southbridge, and processor] to two chips [P55 and Lynnfield], obviously you're going to have a much smaller footprint," Gallo says. "There's going to be power savings, too."

Not surprisingly, a large chunk of the power savings occurs within the quad-core Lynnfield processors.

"When running lightly threaded apps, we can turn off cores completely," Singhal says. "We're using power efficiency in the entire design . . . being mindful of where we are spending power, both active and idle. We're aware that this design will be going into mobile devices eventually."

New Motherboards

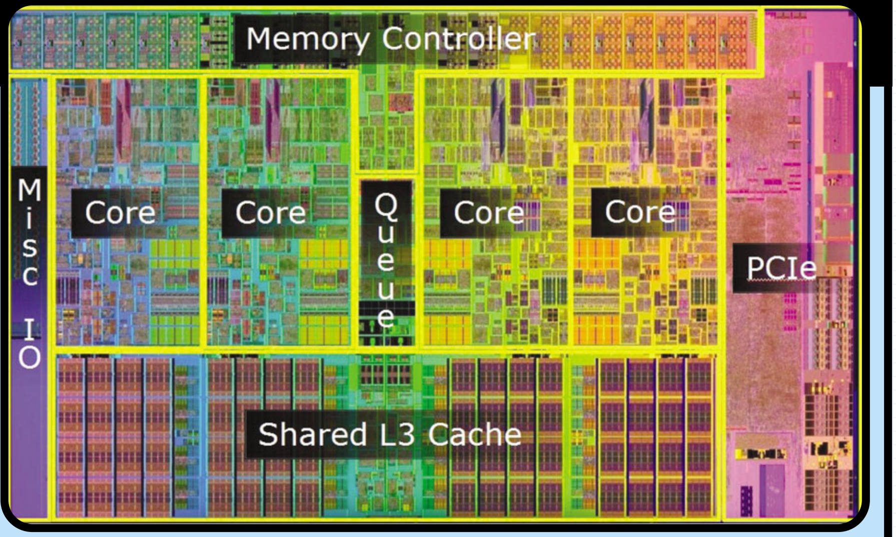
In conjunction with the P55 Express chipset introduction, Intel released a pair of microATX (Whitesburg and Sharpsburg, the DP55WB and DP55SB, respectively) and two ATX (Warrensburg and Kingsberg, the DP55WG and DP55KG, respectively) motherboards.

The introduction of the P55 Express should provide significant performance improvements for midrange systems. Intel's hope is that bringing the features of Nehalem-based processors, such as Lynnfield, to midrange prices will make the chip an attractive upgrade for an even broader swath of consumers.

With this type of news, the answer to the aforementioned philosophical question is obvious. If a chipset consists of only one chip but offers this type of improvement, it can call itself whatever it wants. ▲

by Kyle Schurman

New Lynnfield Processors



In conjunction with the P55 Express, Intel announced three new Lynnfield quad-core processors, with the die layout shown above. The specifications are as follows:

Processor	Clock Speed	Cache	Memory Speed Supported	TDP	Price*	Cores/Threads
Core i7-870	2.93GHz	8MB	DDR3-1333	95W	$562	4/8
Core i7-860	2.80GHz	8MB	DDR3-1333	95W	$284	4/8
Core i5-750	2.66GHz	8MB	DDR3-1333	95W	$196	4/4

**Price per 1,000 units*

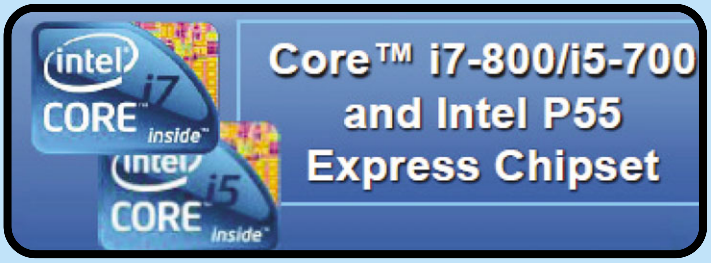
Source: Intel

P55 Vs. X58

Intel's recent announcement teams its P55 Express chipset with Lynnfield processors (Core i7-800 series and Core i5-700 series). Intel is aiming this configuration at a different customer than its previous configuration of an X58 Express chipset and Bloomfield processors (Core i7-900 series).

Here are some of the differences between the two configurations. ▲

Source: Intel

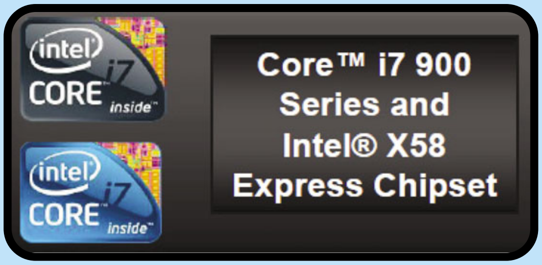

intel
i7
CORE
inside
intel
i5
CORE
inside
Core™ i7-800/i5-700 and Intel P55 Express Chipset

P55 With Core i7-800

- Intel aims P55 with Core i7-800 at midrange users requiring multitasking and high-end digital media management and gaming
- CPU contains four cores and eight threads
- Supports Hyper-Threading technology and Intel Turbo Boost technology
- Two channels of DDR3 memory support (1,333MHz)
- Midrange graphics support with up to 16 PCI-E 2.0 lanes, with potential combinations of single X16 or dual X8 setup

P55 With Core i5-700

- Intel aims P55 with Core i5-700 for mainstream digital media and gaming management
- CPU contains four cores and four threads
- Supports only Intel Turbo Boost technology
- Two channels of DDR3 memory support (1,333MHz)
- Midrange graphics support with up to 16 PCI-E 2.0 lanes, with potential combinations of single X16 or dual-X8 setup


intel
i7
CORE
inside
intel
i7
CORE
inside
Core™ i7 900 Series and Intel® X58 Express Chipset

- Intel aims X58 at high-end gaming and enthusiast platforms
- CPU contains four cores and eight threads
- Supports Hyper-Threading technology and Intel Turbo Boost technology
- Three channels of DDR3 memory support (1,066MHz)
- High-end graphics support with up to 32 PCI-E 2.0 lanes, with potential combinations of dual-X16 or quad-X8 configuration

Intel's Processor Roadmap

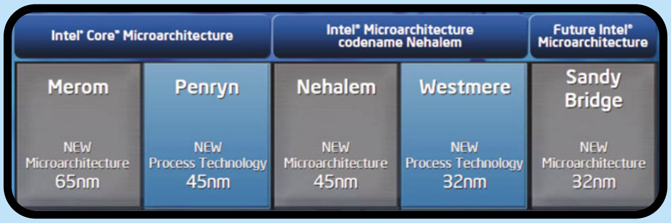
As Intel migrates to its next-generation, 32nm chip manufacturing technology, the company is planning expenditures of about $8 billion, with much of the money going toward upgrades in manufacturing fabs in Arizona, New Mexico, and Oregon.

Intel's production of Westmere, a series of 32nm mobile and desktop processors, should begin in the fourth quarter of this year. Westmere essentially will be a migration of the Nehalem architecture to the 32nm manufacturing process. Westmere will bring the following:

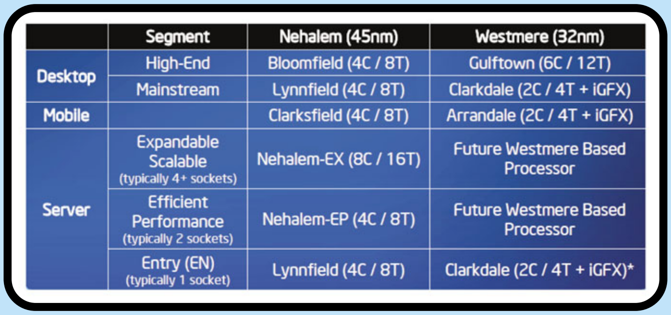
- Six-core processor supporting 12 threads, code-named Gulftown, appearing in 2010
- Smaller processor core size
- New multichip package with graphics integrated into the processor

The next Intel processor architecture that will replace Nehalem/Westmere will be Sandy Bridge, and it will start with the 32nm manufacturing process. Sandy Bridge may appear in late 2010. ▲

Source: Intel



Intel® Core™ Microarchitecture		Intel® Microarchitecture codename Nehalem		Future Intel® Microarchitecture
Merom	Penryn	Nehalem	Westmere	Sandy Bridge
NEW Microarchitecture 65nm	NEW Process Technology 45nm	NEW Microarchitecture 45nm	NEW Process Technology 32nm	NEW Microarchitecture 32nm



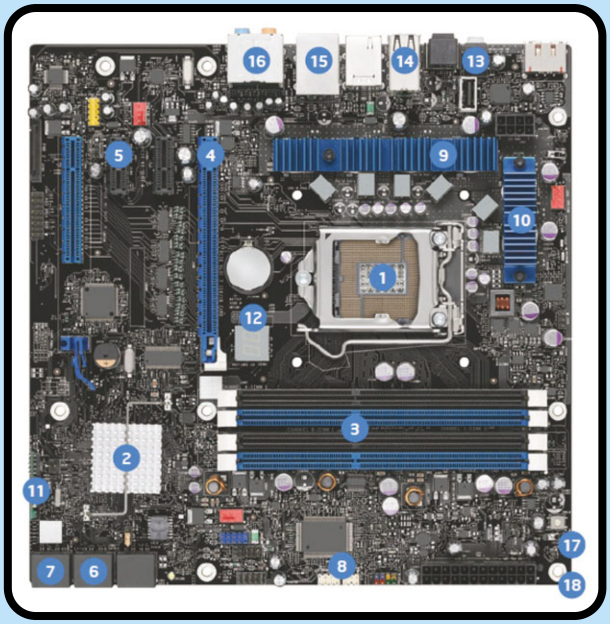
	Segment	Nehalem (45nm)	Westmere (32nm)
Desktop	High-End	Bloomfield (4C / 8T)	Gulftown (6C / 12T)
	Mainstream	Lynnfield (4C / 8T)	Clarkdale (2C / 4T + iGFX)
Mobile		Clarksfield (4C / 8T)	Arrandale (2C / 4T + iGFX)
Server	Expandable Scalable (typically 4+ sockets)	Nehalem-EX (8C / 16T)	Future Westmere Based Processor
	Efficient Performance (typically 2 sockets)	Nehalem-EP (4C / 8T)	Future Westmere Based Processor
	Entry (EN) (typically 1 socket)	Lynnfield (4C / 8T)	Clarkdale (2C / 4T + iGFX)*

Sharpsburg & Whitesburg Motherboards

The two Intel microATX motherboards for the P55 Express chipset, Sharpsburg (DP55SB) and Whitesburg (DP55WB), each measure 9.6 x 9.6 inches. Here are the components on the microATX motherboards. (Sharpsburg contains more components than Whitesburg.)

1. Socket LGA 1156 for Core i7 or Core i5 processors
2. P55 Express chipset
3. Dual-channel DDR3 memory slots (1,600+/1,333/1,066MHz support for Sharpsburg; 1,333/1,066MHz support for Whitesburg)
4. One PCI-E 2.0 x16 slot
5. Two PCI-E 2.0 x1 slots (one additional PCI expansion slot for Whitesburg, one PCI-E x4 slot for Sharpsburg)
6. Six SATA ports (one additional eSATA port for Sharpsburg)
7. Intel Matrix Storage Technology
8. Infrared transmitter and receiver (Sharpsburg only)
9. Voltage regulator to assist in maintaining consistent temperatures (Sharpsburg only)
10. Six-phase voltage regulator (Sharpsburg only)
11. Bluetooth (Sharpsburg only)
12. Post-code decoder (Sharpsburg only)
13. Back-to-BIOS switch (Sharpsburg only)
14. One IEEE 1394a port, eight USB 2.0 ports, and six additional USB 2.0 ports via internal headers
15. Gigabit Ethernet port
16. 7.1-channel Intel HD Audio (5.1 channel for Sharpsburg)
17. Lead-free manufacturing

Source: Intel

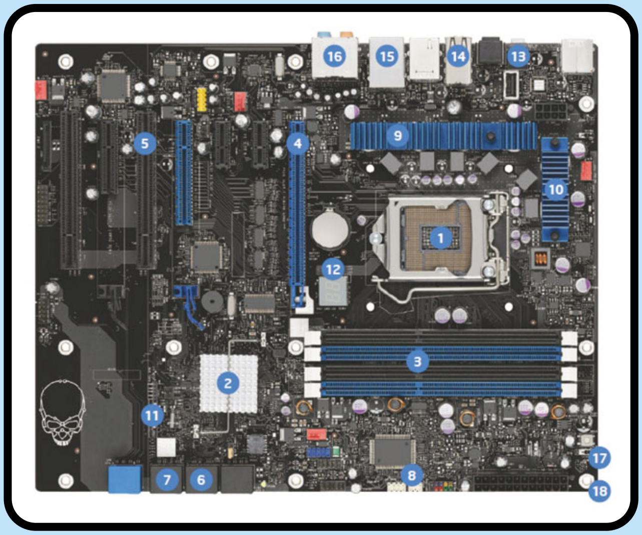


Kingsberg & Warrensburg Motherboards

Intel has introduced two ATX motherboards for the P55 Express chipset, Kingsberg (DP55KG) and Warrensburg (DP55WG). Warrensburg measures 12 x 9.6 inches, and Kingsberg is 11.6 x 9.6 inches. Here are the components on the ATX motherboards. (Kingsberg contains more components than Warrensburg.)

1. Socket LGA 1156 for Core i7 or Core i5 processors
2. P55 Express chipset
3. Dual-channel DDR3 memory slots (1,600+/1,333/1,066MHz support)
4. One PCI-E 2.0 x16 slot
5. Two PCI-E 2.0 x1 slots, one PCI-E 2.0 x4 slot, and two PCI expansion slots (additional PCI-E 2.0 x2 slot available on Kingsberg)
6. Six SATA ports (two additional eSATA ports and two additional SATA ports for Kingsberg)
7. Intel Matrix Storage Technology
8. Infrared transmitter and receiver
9. Voltage regulator to assist in maintaining consistent temperatures (Kingsberg only)
10. Six-phase voltage regulator (Kingsberg only)
11. Bluetooth (Kingsberg only)
12. Post-code decoder
13. Back-to-BIOS switch
14. One IEEE 1394a port, one additional 1394a port via internal header, eight USB 2.0 ports, and six additional USB 2.0 ports via internal headers
15. Gigabit Ethernet port
16. 7.1-channel Intel HD Audio
17. Lead-free manufacturing

Source: Intel



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HE CARDS

CPU'S MIGHTY GRAPHICS ROUNDUP

When last we visited the Video Card Buyer's Guide in our December 2008 issue (see page 56), the top graphics cards available were Nvidia's GTX 280 and ATI's Radeon HD 4870 X2. How quickly times change. You'll have difficulty finding either graphics card now, as both Nvidia and ATI have completely revamped both their high-end and low-end lines.

To help you pick the right card, we'll take a look through what's happened in the world of graphics cards from last year.

The Nvidia Side

Beginning at CES on Jan. 9, Nvidia announced the GeForce GTX 285 and 295, both of which are manufactured using a 55nm fabrication process. The smaller chips reduced the necessary power to the GT200 series and lowered PCB heat to give Nvidia the ability to increase the clock speeds on the GTX 285 and create the dual-GPU GTX 295. In terms of the nitty-gritty specs, the GTX 285 outpaces the GTX 280 in core clock (648MHz vs. 602MHz), shader clock (1,476MHz vs. 1,296MHz), and memory clock (1,242MHz vs. 1,107MHz). And to power the GTX 285, you need two 6-pin PCI-E power connectors, a small step down from the 6-pin and 8-pin connectors needed for the GTX 280. The GeForce GTX 295 offers clock, shader, and memory speeds similar to the GTX 260. Initially, Nvidia offered the GTX 295 with two PCBs stacked within a two-slot card, but the GTX 295 now features a single-PCB, two-slot design. At press time, MSRPs for stock-clocked GeForce GTX 285s were around $350, while the GTX 295 was around $500.

In April, Nvidia released the GeForce GTX 275 and the GTS 250. The GeForce GTX 275 let Nvidia offer a card in the $200 to $300 price range that featured Nvidia's 55nm fabrication process. Like the GTX 280 and 285, the GTX 275 has 240 processor cores and is a single-GPU card, but its clock speeds are lower than the GTX 285. The GeForce GTS 250 offers similar specs to the GeForce 9800 GTX+ but is shorter and requires only one 6-pin PCI-E power connector. Essentially, the GeForce GTS 250 will be the Nvidia option in the $100 to $150 price range for the foreseeable future. If you're shopping in the $150 to $200 range, last year's GeForce GTX 260 is still available.

On the software and accessory side, Nvidia released its 3D Vision system. All of the new cards support the 3D experience when you watch a 3D-enabled monitor using Nvidia's 3D glasses. Additionally, the GT 200 line all feature Nvidia's CUDA acceleration, which is also supported in GeForce 8 and 9 series cards, and PhysX, which improves your gaming experience by offloading physics processing onto the GPU.

The ATI Side

Although ATI didn't show any new graphics cards at CES, it did announce the Dragon desktop platform, which utilizes an AMD 7-Series chip, an AMD 4000 series graphics card, and an AMD Phenom II processor. In April, AMD released the Radeon HD 4890, which featured a new graphics processor—the RV790—that included 800 stream processors, 40 texture units, and 16 ROPs. Compared to the Radeon HD 4870, the previous ATI single-GPU champ, the 4890 offers increases of 100MHz in core clock (850MHz) and 75MHz in memory clock (975MHz). AMD boasted the HD 4890 is capable of a 1GHz core clock, and a few manufacturers currently offer the cards with a 1GHz factory overclock. Depending on the amount of memory (1GB or 2GB) and overclocks, prices for the 4890 ranged between $200 and $300.

Later in April, AMD announced the Radeon HD 4770, which uses a 40nm fabrication process to create a card with 640 stream processors, 32 texture units, and 16 ROPS. Priced around $100, the HD 4770 offers an affordable way for gamers to play DirectX 10.1 games and ATI Avivo HD video processing.

Most recently, AMD announced the ATI Radeon HD 5850 and 5870, which support DirectX 11, ATI Stream (to offload processing from the CPU and similar to Nvida's CUDA), and ATI Eyefinity (supports six independent displays per card). The HD 5850 features 1,440 stream processors and 72 texture units, allowing for a core clock of 725MHz and memory clock of 1,000MHz. The HD 5770 has 1,600 stream processors and 80 texture units with an 850MHz core clock and 1,200MHz memory clock. Initial tests look promising for ATI reclaiming the performance crown. (See our review of the Radeon HD 5870 on page 32 for a full performance breakdown.) ▲

Nathan Lake

SPOTLIGHT

High End (Nvidia)

Evga GeForce GTX 295 CO-OP Hydro Copper

$709.99
www.evga.com

Why we dig it: This card features a full cover copper design, and Evga includes both 3/8-inch and 1/2-inch barb fittings to match the fittings of your watercooling setup and deliver a high-flow interior.

Who should apply: Liquid-cooling system builders who want to push pixels using Nvidia's dual-GPU GTX 295 behemoth.

Memory: 1,792MB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

BFG Tech GeForce GTX 295 OCFU 1792MB

$559.99
www.bfgtech.com

Why we dig it: BFG ramped up Nvidia's powerhouse GTX 295 with a core clock jump of 108MHz, a shader clock increase of 234MHz, and a memory clock increase of 216MHz—pretty serious overclocks for the dual-GPU card. BFG boasts that it handpicks the cards to offer the high factory overclocks.

Who should apply: Power users and gamers who need the fps advantage delivered by the high factory overclocks. Pairing two BFG Tech GeForce GTX 295 OCFU cards in Quad SLI would be particularly devastating.

Memory: 1,792MB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

BFG Tech GeForce 285 OCX 2GB

$349.99
www.bfgtech.com

Why we dig it: BFG added 1GB of memory to this factory-overclocked Nvidia GeForce GTX 285 to increase performance, and the extra memory will come in particularly handy in games at high resolutions. The OCX version runs a core clock of 666MHz and a memory clock of 2,322MHz.

Who should apply: Gamers who want to improve their ability to play video games on large monitors and other HD displays.

Memory: 2GB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

SPOTLIGHT

High End (Nvidia)

PNY XLR8 GeForce GTX 285

$329.99
www.pny.com

Why we dig it: PNY bumped the GTX 285's core clock up to 648MHz, shader clock up to 1,476MHz, and memory clock up to 2,484MHz. And in combination with the 512-bit memory interface, PNY's XLR8 GeForce GTX 285 offers a memory bandwidth of 159GBps.

Who should apply: Power users who play games or use applications that repy heavily on the graphic processor's memory.

Memory: 1GB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

MSI N275GTX Lightning

$299.99
www.msicomputer.com

Why we dig it: This baby is overclockable. MSI built the N275GTX with a 10-layer PCB, implemented a 10-phase power design, and used Hi-c (highly conductive) capacitors and solid core chokes (lowers energy loss compared to traditional chokes) to reduce heat levels. And MSI doubled the card's internal memory to 1,792MB of GDDR3.

Who should apply: Power users who want to test and show off their overclocking skills.

Memory: 1,792MB GDDR3
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI

BFG Tech GeForce GTX 275 OCX

$299.99
www.bfgtech.com

Why we dig it: We got a chance to check out BFG's GeForce GTX 275 (see page 18 of the August 2009 issue), and it offered a little additional overhead for higher clock speeds. BFG factory-overclocks the GeForce GTX 275 OCX's core clock up to 709MHz, shader clock up to 1,566MHz, and memory clock up to 2,484MHz.

Who should apply: People looking for an excellent card between the $250 to $300 price range.

Memory: 896MB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

Midrange (Nvidia)

Gigabyte GV-N26SO-896I

$199.99
www.gigabyte.us

Why we dig it: Gigabyte's GV-N26SO-896I is factory-overclocked with a 680MHz core clock, a 1,466MHz shader clock, and a 2,350MHz memory clock to maximize the GeForce GTX 260 technology. This Core 216 model was picked using Gigabyte's GPU Gauntlet sorting process that selects only premium GPU processors.

Who should apply: People who want a card for less than $200 that's been refined to use the most of its potential.

Memory: 896MB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

PNY XLR8 GeForce GTX 260 Core 216

$179.99
www.pny.com

Why we dig it: The XLR8 GeForce GTX 260 features 216 stream processors, which is an improvement upon the GTX 260's original 192 stream processors. Additionally, the GTX 260 features 896MB of GDDR3 memory with a 448-bit interface.

Who should apply: Users looking for a graphics performance boost for less than $200.

Memory: 896MB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

ECS NBGTS250-1GMU-F

$164.99
www.ecsusa.com

Why we dig it: The NBGTS250-1GMU-F features an Anti-Bending Plate on the back side of the card, which helps to prevent the PCB bending from the heat generated by the GPU. Also, it can well protect the components on the back side of the card from any unexpected damage.

Who should apply: People looking for a card that provides performance, durability, and reliability.

Memory: 1GB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, S-Video

AUDIO

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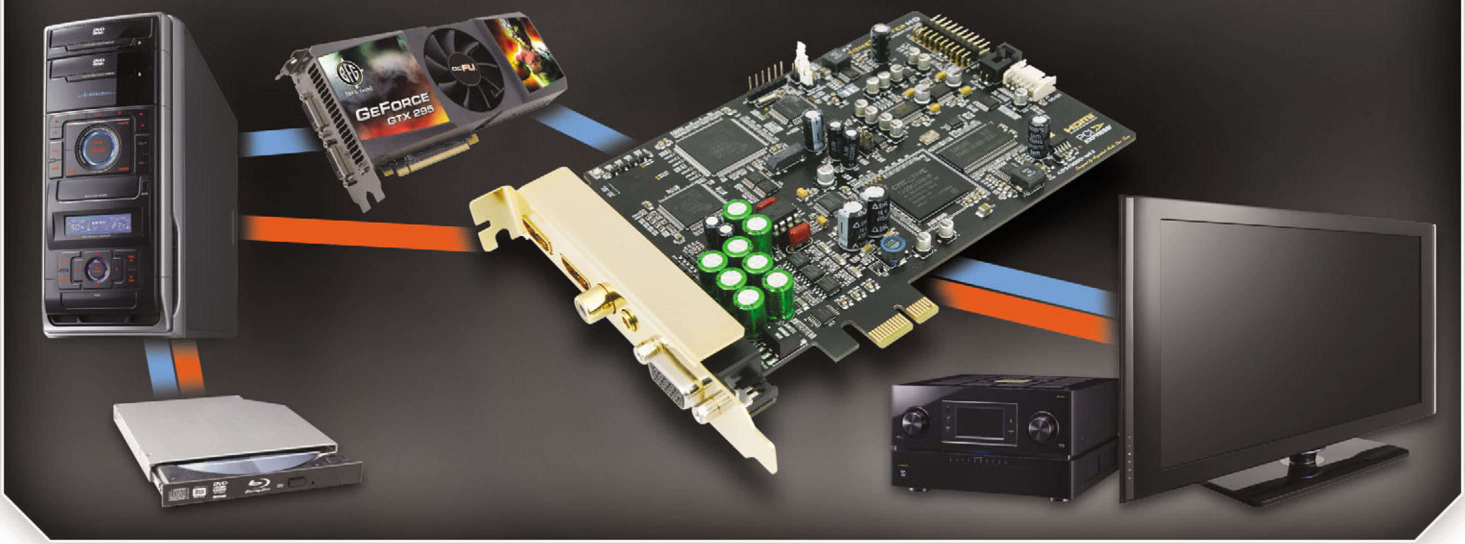

advertisement

DVDs were never able to deliver lossless audio (nor 7.1 channels of sound). That has changed with the advent of Blu-ray discs, which can transfer audio data up to 24.5 Mbps using Dolby® TrueHD or DTS-HD™ Master Audio, a rate 16-times greater than the maxumum DVD-rate of 1.5 Mbps. Blu-ray discs use Dolby® TrueHD or DTS-HD™ Master Audio, which are lossless audio codes that support audio in 7.1.

Bit-by-Bit Video

Watching movies on Blu-ray disc with full 7.1-channel sound is a tantalizing prospect, yet users who want to watch via their PCs have historically been hamstrung because of all the protections embedded on the discs. Initially there was an issue with the Protected Video Path, finally solved with the advent of High-bandwidth Digital Content Protection (HDCP), a form of digital copy protection developed by Intel Corporation. Now, all you need to enjoy Blu-ray movies on your PC is software to decode the video, such as CyberLink's PowerDVD, and an HDCP-compliant Graphics Processing Unit (GPU) and monitor.

Bitstream Audio

Getting at the Protected Audio Path, however, is another story. Currently, no graphics cards support a Protected Audio Path, so you're limited to either Dolby® or DTS™ audio (which are lossy and also only support 5.1 audio), or in a pinch you can output a lossy version of Dolby® TrueHD or DTS-HD™ Master Audio. These two formats support 7.1 audio, but because they're lossy versions, the audio quality will suffer. None of these solutions give us what we want: lossless 7.1-channel surround sound.

In addition to giving you the freedom to watch any Blu-ray movie on your PC in its full audio glory, the Auzen X-Fi HomeTheater HD sound card has a host of attractive features to sweeten the package.

- HDMI v1.3a compliant
- Supports PCM 8 Channel, 24-bit/192 kHz
- Support for 24p True Cinema output
- Support for Blu-ray discs via CyberLink's latest PowerDVD application
- Support for Non-downsampled Blu-ray Audio
- Support for high bit-rate audio such as Dolby® TrueHD, DTS-HD™ Master Audio bitstream
- Developed around Creative X-Fi native PCI Express audio processor
- Support for Dolby Digital Live for Windows XP and Vista, and DTS Neo: PC & DTS Interactive for Vista
- Integrated Headphone Amp and Professional Mic Pre-Amp
- Connectors:
  - HDMI Input
  - HDMI Output
  - Digital Output
  - Headphone Output
  - Analog I/O Multi Connector

The Right Hardware

There's a better way: You can send uncompressed Linear Pulse Code Modulation (LPCM) audio via HDMI from your PC. Thus, you can decode the audio with your software and send it out as uncompressed LCPM, bypassing the need for the Protected Audio Path altogether. But you need the right hardware.

Enter the **Auzen X-Fi HomeTheater HD** sound card. Not only will this device route uncompressed LPCM audio up to 8 channel 24bit/192kHz to your speakers, it will also combine the HDCP-encrypted video signal from the GPU with the uncompressed audio signal and output the two together through a single HDMI cable.

With the **Auzen X-Fi HomeTheater HD** sound card, you can finally enjoy beautiful, bit-by-bit lossless 7.1-channel surround sound, precisely as the original sound engineer mixed it. It's the perfect accompaniment to your Blu-ray movie-viewing experience.

Problem Solved.

The **Auzen X-Fi HomeTheater HD** sound card is available at **Micro Center**®, **Newegg.com**®, **NCIX.com**™, **Canada Computers**, and **Memory Express**™.

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Auzentech, Inc.
www.auzentech.com

Budget (Nvidia)

Biostar VN2503SH52

$124.99
www.biostar-usa.com

Why we dig it: Biostar adds three heatpipes and a blue LED fansink to push heat away from the GeForce GTS 250 and extend the life span of the card. The VN2503SH52 features an HDMI port that supports 8-channel surround sound, and the card is GeForce 3D Vision-ready. The card is also compatible with 2-Way SLI.

Who should apply: With an attractive blue LED, the VN2503SH52 is ideal for people looking to upgrade both the internal technology and appearance of their system.

Memory: 512MB GDDR3
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI

PNY Verto GeForce GT 220

$119.99
www.pny.com

Why we dig it: This affordable card features a core clock of 625MHz and a shader clock of 1,360MHz. It also supports Nvidia's PhysX, CUDA, and PureVideo HD technology.

Who should apply: People who want a cheap way to improve upon a PC that only uses integrated graphics.

Memory: 1GB GDDR3
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI

BFG Nvidia GeForce 8400 GS 512MB PCI

$99.99
www.bfgtech.com

Why we dig it: This PCI version of BFG's GeForce 8400 GS 512MB is ideal for older PCs that need to boost their video playback capabilities.

Who should apply: If you're looking to fix a friend's old PC that only offers PCI slots, the Nvidia GeForce 8400 GS 512MB is a perfect patch.

Memory: 512MB DDR2
Interface: PCI
Ports: DVI, S-Video, VGA

SPOTLIGHT

Budget (Nvidia)

Sparkle GeForce 9800 GT

$89.99
www.sparkle-usa.com

Why we dig it: This card features a power-saving function that automatically reduces the card's power consumption and GPU voltage based on load.

Who should apply: Individuals who want to conserve the power their PC uses without sacrificing the ability to perform "power user" tasks.

Memory: 512MB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter)

ECS N9400GT-1GDS-F

$59.99
www.ecsusa.com

Why we dig it: The 9400GT features Nvidia's PhysX, CUDA, and PureVideo HD technology to increase appearance of high-definition video and the detail of games.

Who should apply: People looking to improve the video playback capabilities of their PC.

Memory: 1GB DDR2
Interface: PCI-E 2.0 x16
Ports: DVI, S-Video, VGA

Zotac ZT-20201-10L

$79
www.zotac.com

Why we dig it: This GT 220 features support for Direct X 10.1 as well as Nvidia's PureVideo, PhysX, and CUDA technologies. It also boasts a max resolution of 2,560 x 1,600 and HDMI output, and with its small height and width, the card makes an excellent addition to an HTPC build.

Who should apply: People looking for a low-profile card for an HTPC build that supports HDMI and HD resolutions as well as DirectX 10.1 and Nvidia PhysX.

Memory: 1GB GDDR3
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI

Workstation (Nvidia)

PNY Nvidia Quadro FX 5800

$3,150
www.pny.com

Why we dig it: The Quadro FX 5800 offers up to 240 CUDA programmable parallel cores and 4GB of memory. The card provides a 512-bit memory interface to deliver a memory bandwidth of 102GBps.

Who should apply: Geophysicists, designers, scientists, engineers, and other technical professionals looking to improve the visual supercomputing of their desktop.

Memory: 4GB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual DVI, DisplayPort

Nvidia Quadro FX 3800

$900
www.nvidia.com

Why we dig it: The single-slot Quadro FX 3800 features Nvidia's SLI Multi OS technology, which lets you run multiple Windows- or Linux-based applications using the GPU's acceleration—from a single desktop.

Who should apply: Workers looking to run virtual Windows or Linux OSes from their desktop.

Memory: 1GB GDDR3
Interface: PCI-E 2.0 x16
Ports: DVI, Dual DisplayPort

Nvidia Quadro FX 580

$173.99
www.nvidia.com

Why we dig it: This entry-level workstation card is designed for 30-bit color fidelity to work with volume CAD and digital content applications. It automatically adjusts the graphics settings, so you won't need to manually change the resolution or bit-depth each time you open a program.

Who should apply: Workers on a budget who want to improve their experience when working with CAD or digital content.

Memory: 512MB GDDR3
Interface: PCI-E 2.0 x16
Ports: DVI, Dual DisplayPort

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www.aerocool.us

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High End (ATI)

Diamond ATI Radeon HD 5870

$399.99
www.diamondmm.com

Why we dig it: It's the first graphics card to support DX11. Like most first offerings, the card sports ATI's stock clocks—850MHz core and 1,200MHz memory.

Who should apply: ATI fans who want the latest and greatest from Team Red.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, DisplayPort, HDMI

XFX ATI Radeon HD 5870

$399.99
www.xfxforce.com

Why we dig it: It's the fastest of ATI's new Radeon HD 5000 series, and with support for DirectX 11, you can view 3D effects with Tessellation, DirectCompute, HDR Texture Compression, and Shader Model 5.0 technology.

Who should apply: Power users who want the highest-end and newest card available.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, DisplayPort, HDMI

Diamond ATI Radeon HD 5850

$299.99
www.diamondmm.com

Why we dig it: 2.15 billion transistors, 1,440 stream processors, and support for CrossFire X. What more can you ask from a card that costs $300?

Who should apply: ATI fans who want one of the top consumer cards for video editing, HD video playback, and gaming.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, DisplayPort, HDMI

SPOTLIGHT

High End (ATI)

XFX ATI Radeon HD 5850

$299.99
www.xfxforce.com

Why we dig it: It offers support for DirectX 11, ATI Eyefinity for up to three displays, and ATI PowerPlay technology to conserve power.

Who should apply: Power users who want one of the newest graphics cards available and support for the latest video technologies.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, DisplayPort, HDMI

Sapphire Vapor-X HD4890 2GB

$279.99
www.sapphiretech.com

Why we dig it: Sapphire offers an additional 1GB of graphics memory, and with Sapphire's Vapor-X cooling module, the card has been pushed to a core clock of 870MHz and a memory clock of 1,050MHz.

Who should apply: If you regularly perform video rendering or play games at the highest resolutions, you'll appreciate the extra 1GB of video memory on the Vapor-X HD4890 2GB.

Memory: 2GB GDDR5
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI, DisplayPort

Sapphire Toxic HD 4890

$249.99
www.sapphiretech.com

Why we dig it: Sapphire factory-overclocks the ATI Radeon 4890 HD with 960MHz core clock and 1,050MHz memory clock. A large fan on the bottom side of the graphics card helps pull hot air away from the card.

Who should apply: Gamers looking for a competitive edge by installing a graphics card with high core and memory overclocks.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, VGA (via adapter), HDMI (via adapter)

Midrange (ATI)

Asus EAH4890

$244.99
www.asus.com

Why we dig it: The EAH4890 includes Asus' Voltage Tweak technology, which lets you boost the GPU voltages using the SmartDoctor application to increase performance by up to 15%. It raises GPU voltages from 1.312V to 1.4V to boost clock speed from 850MHz to 950MHz.

Who should apply: People who want the ability to easily overclock their GPU.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, S-Video, HDMI (via adapter)

Gigabyte GV-R489OC-1GD

$209.99
www.gigabyte.com.tw

Why we dig it: Gigabyte teamed with Zalman to deliver a quiet Radeon HD 4890. The GV-R489OC-1GD supports ATI's CrossFireX and Avivo HD technology and offers similar specs to stock-clocked 4890s.

Who should apply: Power users who desire a quiet graphics card and support for ATI Stream and DX10.1.

Memory: 1GB GDDR3
Interface: PCI-E 2.0 x16
Ports: Dual HDMI and VGA

MSI R4890-T2D1G-OC

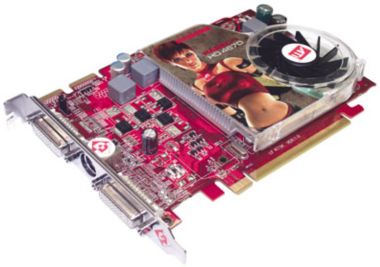
$203
www.msicomputer.com

Why we dig it: MSI increased the core clock on this Radeon 4890 to 880MHz. The R4890-T2D1G-OC also includes the DVI-to-HDMI adapter to let you send 7.1 surround sound over the HDMI connection.

Who should apply: ATI fans who want to game at the highest resolutions or port audio and video over an HDMI connection.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, S-Video, HDMI (via adapter)

Midrange (ATI)



Asus EAH4870

$159.99
usa.asus.com

Why we dig it: With 1GB of memory, the EAH4870 has more memory than the reference ATI Radeon HD 4870. Asus also added its Dark Knight cooler, which features a four-heatpipe design and a fan to pull heat away from the card.

Who should apply: People shopping for a quality card in the $150 to $200 price range.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, S-Video

Diamond 4890PE51GXOC

$225.99
www.diamondmm.com

Why we dig it: Diamond has overclocked the 4890's core clock to 925MHz and bumped the memory clock to 1,050MHz. This version of the card also features an additional 512MB of memory for a total of 1GB.

Who should apply: People looking for a top-notch ATI Radeon HD 4890.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, S-Video

Diamond 4670PE31GDT

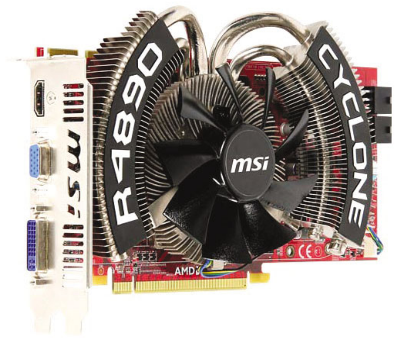
$105
www.diamondmm.com

Why we dig it: This affordable card supports resolutions up to 2,560 x 1,600. Diamond has overclocked the memory clock to 900MHz.

Who should apply: Budget builders who want to improve their ability to play games, edit video, or use productivity applications at the highest resolutions.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, S-Video

Budget (ATI)



MSI R4770 Cyclone

$120
www.msicomputer.com

Why we dig it: MSI builds a large pulse width-modulated fan, which helps reduce noise and increase cooling efficiency. The Cyclone design also features four heatpipes to move hot air away from the card.

Who should apply: Users who want a graphics card that offers enough cooling to let them overclock the card without sacrificing its life span.

Memory: 512MB GDDR5
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI

Biostar VA4853NHG2

$99.99
www.biostar.com.tw

Why we dig it: Biostar adds solid capacitors and a high-speed, 7.5cm cooling fan to increase the stability and durability of the Radeon HD 4850. Although it runs at stock clocks, the card offers features ideal for overclocking.

Who should apply: People looking for an affordable video card with HDMI or DVI outputs that gives you the freedom to overclock the GPU.

Memory: 1GB GDDR3
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI

Sapphire Ultimate HD 4670

$69.99
www.sapphiretech.com

Why we dig it: This card features passive cooling heatpipes, so the graphics card won't add to the noise level on your system. It offers DVI, VGA, and HDMI outputs.

Who should apply: People, such as HTPC builders, who want a system that runs quiet.

Memory: 1GB GDDR5
Interface: PCI-E 2.0 x16
Ports: DVI, VGA, HDMI

SPOTLIGHT

Workstation (ATI)

ATI FireGL V8650

$1,999.99
www.amd.com

Why we dig it: The V8650 offers stereoscopic 3D display capabilities and supports rendering in 8-bit, 10-bit, and 16-bit per color component. And unified shaders let you set priority tasks to improve throughput for the applications you need the most.

Who should apply: People who work with large datasets, such as fields for medical imaging, digital content creation, and simulation.

Memory: 2GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DVI, DisplayPort

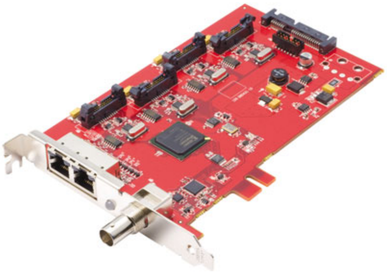
Sapphire ATI FirePro V8750

$1,449.99
www.sapphiretech.com

Why we dig it: 800 unified shader engines and a memory bandwidth of 115.2GBps let the FirePro V8750 crank through render times. It also offers a 2GB GDDR5 frame buffer to avoid memory limitations. ATI Stream technology helps your workstation balance workloads and utilizes your CPU and GPU for application performance.

Who should apply: Engineers, scientists, and other professionals who can take advantage of the shader units and memory bandwidth. Two DisplayPort outputs help deliver advanced multiple monitor support.

Memory: 2GB GDDR5
Interface: PCI-E 2.0 x16
Ports: Dual DisplayPort, DVI



ATI FirePro S400

$699.99
www.amd.com

Why we dig it: Compatible with the FirePro V8750, the FirePro S400 is a synchronization module that provides framelock and gunlock synchronization to reduce jumping, flicker, and scan lines. It supports four graphics cards and features four SATA power connectors to receive and synchronize signals among the input sources.

Who should apply: Those who work in broadcast, video editing, simulation, and other demanding display applications that require synchronization.

Interface: PCI-E 2.0 x1
Ports: Four SATA

The Bleeding Edge Of Software

Inside The World Of Betas

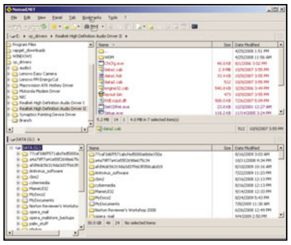
Nomad.NET 2.6.8.1195 RC

There is no shortage of Explorer alternatives for working with your files, but to the best of our knowledge, there are no full-featured alternatives built with Microsoft's .NET technologies. Although some might say "Good!" and scoff, Nomad.NET proves that skilled programmers can develop great programs with .NET. Nomad.NET is fast, ripe with options and clever tools, and is generally a pleasure to use.

Nomad.NET is the son of the highly regarded Nomad file manager (which, as you might surmise, wasn't written using .NET), although its author says that there isn't a single line of code reused between the two. We can't vouch for the new code, but Nomad.NET feels like a program that's highly evolved from many user suggestions and years of the author "eating his own dog food"; those are the programs we like the best.

You can arrange Nomad.NET nearly any way you like, such as traditional two-pane vertical or horizontal, single pane with tabs, or even as a thumbnail viewer. The ability to let one pane look one way (traditional folders + files) while another pane looks a totally different way (thumbnails) is especially nifty. You can also save and recall layouts for easy switching. On top of this, additional downloadable themes and icon sets let it integrate neatly with nearly any OS theme or interface you can dream up.

Various features we wish we could find in other file managers include built-in MD5 hash scanning, instant folder size calculations, more column types for file listings than we've ever seen (including columns that can read file metadata, such as ISO speed for digital photographs, bitrates for audio files, or the author of Office files), and amazingly capable Filter and Search commands.



Nomad.NET 2.6.8.1195 RC
Publisher and URL: Eugene Sichkar, www.nomad-net.info
ETA: Q4 2009
Why You Should Care: Proof positive that powerful and stylish .NET software development is possible. Plus, it's a good, free file manager.

Though Nomad.NET takes up a bit more memory than competing programs (more than 50MB in our tests), sufficiently modern PCs won't have any trouble with it. We encountered no beta-related issues and proclaim this release candidate ready to be released into the wild. ▲

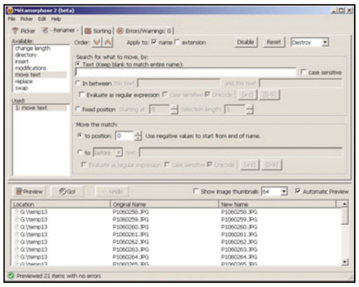
by Warren Ernst

Métamorphose 2 0.6.3 Beta

Renaming one file at a time is a simple task, but when you need to rename dozens (or thousands) then things can become complicated and time-consuming. Métamorphose is an open-source tool that certainly reduces the length of time needed to rename large numbers of files, but its huge breadth of options and somewhat unusual interface doesn't necessarily reduce the complexity of the job—at least not at first.

Métamorphose works with files recursively, meaning that it can rename files within folders; it can even rename subfolders. To ensure against renaming mishaps, a preview window displays what files will be renamed, and there's also an Undo command if you missed something in the preview. Métamorphose can look at EXIF data and ID3 tags in image files and MP3 files, respectively, renaming files based on what it finds. To automate tasks, Métamorphose supports regular expressions. On a more basic level, Métamorphose can add prefixes or suffixes to filenames, automatically number files with integers, Roman numbers, or alphanumeric characters; alter capitalization; and alter the date and time of the files.

The interface is basically a wizard, with the tabs running along the top of the window representing each of the major steps of selecting a folder and files, specifying the renaming rules, applying any sorting options, and then reviewing the changes before actually renaming the files. The problem is that there seem to be a million options within each tab, and the program uses terms that aren't immediately obvious. A detailed Help file and Web FAQ offer a good rundown of all the options but are a little short on examples.



Apply to: ☑ name ☐ extension

Search for what to move, by:
● Text (Keep blank to match entire name):
☐ case sensitive
○ In between this text: and this text:
☐ Evaluate as regular expression ☐ case sensitive ☑ Unicode [a-z] [0-9]
○ Fixed position Starting at: 0 Selection length: 1

Move the match:
● to position: 0 Use negative values to start from end of name.
○ to before text:
☐ Evaluate as regular expression ☐ case sensitive ☑ Unicode [a-z] [0-9]

☐ Show image thumbnails 64 ☑ Automatic Preview

Location	Original Name	New Name
G:\temp13	P1060258.JPG	P1060258.JPG
G:\temp13	P1060259.JPG	P1060259.JPG
G:\temp13	P1060260.JPG	P1060260.JPG
G:\temp13	P1060261.JPG	P1060261.JPG
G:\temp13	P1060262.JPG	P1060262.JPG
G:\temp13	P1060263.JPG	P1060263.JPG
G:\temp13	P1060264.JPG	P1060264.JPG

Previewed 21 items with no errors

Métamorphose 2 0.6.3 Beta
Publisher and URL: Ianaré Sévi; file-folder-ren.sourceforge.net
ETA: Q4 2009
Why You Should Care: Need to rename thousands of files? Look no further.

Still, with a little experimentation on a folder full of sample files, we got the hang of it quickly. And with all those available options, there's little doubt you too will soon be able to rename thousands of files and folders exactly the way you want. ▲

by Warren Ernst

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ATI Radeon™ 5850 1GB Video Card
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XG XtremeCool Silent & Overclocking Proof CPU Cooling System

System comes with
LG® DVD 24X±RW
Xtreme Gear® Keyboard
LG® DVD 16X DVD-ROM
Xtreme Gear® Optical Mouse
AMD 7.1 600 W
FREE 802.11G

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630 CPU	$ 1055
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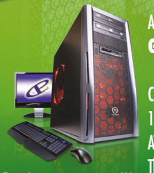

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ATI Radeon™ HD4850 1GB Video Card
ThermalTake Element T Tower Case w/ 600 Watt Power Supply
XG XtremeCool Silent & Overclocking Proof CPU Cooling System

System comes with
4X Blu-ray Player
Xtreme Gear® Keyboard
LG® DVD 24X±RW
Xtreme Gear® Optical Mouse
AMD 7.1 600 W
FREE 802.11G

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NVIDIA® GeForce® GT 220 1GB
Azza Orion Mid-Tower w/See thur Window 420 Watt

System comes with
LG® DVD 24X±RW
Xtreme Gear® Keyboard
AMD 7.1 600 W
Xtreme Gear® Optical Mouse
FREE 802.11G

AMD Phenom™ II X4 Quad-Core Processor

965 CPU	$ 699 (Black Edition)
955 CPU	$ 675
945 CPU	$ 655
910 CPU	$ 599

AMD Phenom™ II X2 Dual-Core Processor

550 CPU	$ 569

AMD Athlon™ II X4 Quad-Core processor

630 CPU	$ 599
620 CPU	$ 575

AMD Athlon™ II X2 Dual-Core Processor

250 CPU	$ 545

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UP TO SPEED

Upgrades That'll Keep You Humming Along

In addition to new graphics drivers from both Nvidia and AMD, Apple offers up a major upgrade to iTunes, and Google gooses its Earth application with some adrenaline.

Software Updates

Avant Browser 11.7 Build 39

The customized version of Internet Explorer received a round of bug fixes with Build 37; Build 39 corrects a flaw with Online Storage that prevented Avant Browser from downloading profiles. The latest update also fixes an autofill issue.

www.avantbrowser.com

CCleaner 2.23.999

The system file and Registry cleaner boosts its Opera performance as the browser moves to version 10. It also fixes a "No Disk" exception error and a bug in 64-bit Registry scanning.

www.ccleaner.com

Google Earth 5.1

The 3D mapping program from Google is after speed in this first revision to Version 5. Memory handling has been improved, which lets more buildings and landmarks appear at any time. Flyovers should now be smoother with fewer irritating hiccups. Google also claims that Google Earth 5.1 should start up 25% faster.

earth.google.com

iTunes 9

The most popular music player/library of all receives a major overhaul. Genius recommendations now work for movies, television shows, and iPhone apps. iTunes Extras and iTunes LP features offer more downloadable multimedia for film and album purchases, respectively. Home sharing enables media transfers for up to five systems across a home network. Also, the iTunes Store gets its most substantial makeover (now with personalized recommendations) in a number of years.

www.apple.com/itunes

Mac OS X 10.6.1

The latest edition of Apple's Mac OS X operating system receives an update that resolves problems with some Sierra Wireless 3G modems, occasional DVD playback problems, and difficulties removing some items from the Dock. Apple also applied specific fixes to Mail and Motion 4.

support.apple.com

Maxthon 2.5.8.1332

The alternative browser renowned for its customizability corrects an issue when the Refresh and Stop buttons are merged. This update also fixes a bug that prevented Internet Options from opening occasionally.

www.maxthon.com

Paint.NET 3.5 Beta 1

Ramping up for a formal beta release of the 3.5 version of this alternative to Photoshop, the program takes some of its visual cues from Windows 7. Icons and menus have been aligned with Win7.

www.getpaint.net

pdfFactory 3.51

The easy PDF creation tool now saves the Always Embed All Fonts setting when you change it. FinePrint Software has combined the 32-bit and 64-bit releases into a single downloadable package. Version 3.51 also fixes crashes associated with long print job names and issues where pdfFactory asked for a password for PDFs that didn't have one.

www.fineprint.com

XFire 1.114

The memory-resident chat and in-game messaging client improves its Live Video feature by reducing broadcast bandwidth and CPU usage. The update resolves problems for users with IE 8 installed and those logging in with MSN.com accounts.

www.xfire.com

Driver Bay

Adobe Camera Raw 5.5

The invaluable plugin to transfer the various formats of Raw imagery from cameras to Adobe programs is refreshed with support for the latest camera models. The Nikon D300s and D3000, Olympus E-P1, and Panasonic DMC-FZ35 and DMC-GF1 are now included. The Raw plugin replaces the version that was packed in with the recent Adobe Creative Suite 4 and Photoshop CS4.

www.adobe.com

ATI Catalyst 9.9

For Radeon HD series boards, the new ATI drivers resolve several problems related to the Catalyst Control Center, including error messages related to HDMI hot-plugging and an unhandled exception error that occurred when starting the Hotkeys Manager. Various problems specific to Windows XP, Vista, and Win7 have also been addressed.

ati.amd.com

Intel Chipset Device Software 9.1.1.1019

The device information software that tells Windows how to configure hardware is now ready for Win7 and Intel's 5 Series chipsets. This version also fixes problem related to v9.1.1.1016 where INFs weren't installed on 64-bit operating systems.

www.intel.com

Nvidia GeForce 190.62

The new drivers for Nvidia cards add support for OpenGL 3.1 and CUDA 2.3. Power-management settings for 9-series cards is added, and the drivers are optimized for the latest PhysX-powered games.

www.nvidia.com

by Steve Smith

PC Tools ThreatFire 4.6

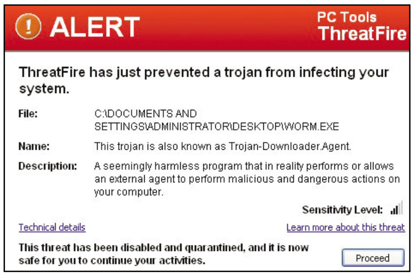
Your traditional antivirus program relies on comparing an executable file's signature against a downloaded list of constantly updated definitions, sort of like you comparing the faces you see of people on the street against a wanted poster. When malware executables were fairly static and consistent, this wasn't a bad approach, but the face of malware is changing—literally.

Today, infected Web sites and email-bots alter the infected executables they generate so frequently that each virus generated is practically unique, thwarting traditional AV routines. ThreatFire looks to augment your existing antivirus software with "behavior profiling," looking at what executables do instead of what they look like before quarantining them and protecting you. Amazingly, this plan actually works pretty well, and we think ThreatFire is a great way to augment a lower-tech, traditional antivirus program. And it is free to boot.

Older versions of ThreatFire offered a traditional antivirus program for a fee, but it was never as complete as the best AV software packages, so the current version ditches it altogether—a good idea.

ThreatFire still downloads signatures periodically, but only to put a name on the nasty behavior it observes and blocks. Recognized threats are blocked automatically, while unknown threats pop up a blocking window that requires you to answer the question, "Do You Want This Blocked Or Not?" The correct answer is normally Kill And Quarantine This Process, but unfortunately, the other option of Allow This Process To Continue is listed first and in the same font, which could be confusing to novices.

When run in conjunction with antivirus software, the system slowdown after adding ThreatFire was minimal (less than 4% in most benchmarks), and it blocked altered nasties as they ran even when the base AV software let them through.



ThreatFire has just prevented a trojan from infecting your system.

File: C:\DOCUMENTS AND SETTINGS\ADMINISTRATOR\DESKTOP\WORM.EXE

Name: This trojan is also known as Trojan-Downloader.Agent.

Description: A seemingly harmless program that in reality performs or allows an external agent to perform malicious and dangerous actions on your computer.

This threat has been disabled and quarantined, and it is now safe for you to continue your activities.

Newer security suites such as Norton Internet Security 2010, which have their own methods of detecting nearly unique malware executables won't benefit from you adding ThreatFire, but nearly every other security program will, so we suggest trying it if you want enhanced security. ▲

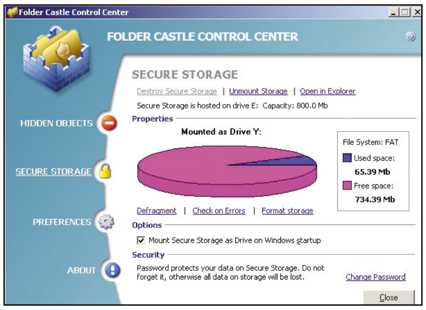
by Warren Ernst

ThreatFire 4.6
Free
PC Tools
www.threatfire.com
●●●●

MagneticSoft Folder Castle 4.1

Who among us doesn't have files on our PCs that we'd rather have hidden from prying eyes, be they simply other computer users in our household or total strangers who might recover our missing (or stolen) notebook PC? Folder Castle can prevent prying eyes from spying your stuff via two methods: hiding individual folders and files or scrambling files with AES encryption, though each feels very basic compared to competing products. If "basic" is all you want, then Folder Castle is worth a look.

Once installed, the "hiding" module is very straightforward: Right-click a folder or file and choose Hide to remove it from view. To view it again, click Unhide from the optional Folder Castle toolbar, which appears on most Explorer windows, or press the hotkey. Either way, you need to enter a password before the files appear. The main Folder Castle window (also password-protected) will list all hidden material in case you forget. Hidden files on your hard drive are visible when booting from another system or LiveCD, and hidden files on external drives appear when you plug the drive into a different machine, so don't count on Folder Castle to protect you from determined snoopers.


Folder Castle Control Center
FOLDER CASTLE CONTROL CENTER
HIDDEN OBJECTS
SECURE STORAGE
PREFERENCES
ABOUT
SECURE STORAGE
Destroy Secure Storage | Unmount Storage | Open in Explorer
Properties
Defragment | Check on Errors | Format storage
Options
Security
Change Password
Close

Secure Storage is hosted on drive E: Capacity: 800.0 Mb

Mounted as Drive Y:

File System: FAT
Used space: 65.39 Mb
Free space: 734.39 Mb

☑ Mount Secure Storage as Drive on Windows startup

Password protects your data on Secure Storage. Do not forget it, otherwise all data on storage will be lost.

Much like TrueCrypt, Folder Castle can also create an AES-encrypted file locker that appears as a drive letter. Just create the partition and password, and then store (or open and close) files within it, and the files are automatically encrypted. It works fast, and the driver is less than 5MB. You can create them on external drives for portability, though anyone else wanting to use the files on it also needs Folder Castle.

Unlike TrueCrypt, however, there's no layer of "plausible deniability" by storing an encrypted partition within an encrypted partition. And Folder Castle is Windows-only, so you can't share encrypted stores with Mac or Linux users. TrueCrypt can also encrypt your entire hard drive and OS, plus it's free and open-source.

TrueCrypt doesn't hold one's hand like Folder Castle, however, so it may be suitable for beginners willing to pay the $39.95 entrance fee. ▲

by Warren Ernst

Folder Castle 4.1
$39.95
MagneticSoft
www.magneticsoft.com
●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◐ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Canson Papershow

Virtual whiteboards are handy tools, but interfacing with them is difficult using a digital tablet and next to impossible using a mouse. Papershow makes the process much more natural by letting you literally write on paper using the included ballpoint pen and instantly have the results displayed on a PC.

Installation is painless. Just pop the included transceiver in an empty USB port, launch the autorun executable, and follow the prompts to install the preloaded software and synchronize the pen with the transceiver. This setup is nice because it lets you carry the pen and transceiver around and use them on any PC.

You can start with a blank whiteboard or import an image or presentation to annotate. You then use the pen to write on a special pad of paper (48 sheets are included, plus another 30 sheets of inkjet paper for printing slideshows to annotate by hand), and whatever you write there instantly appears on the computer screen. The paper is sprinkled with miniscule dots that are tracked by a small sensor built into the pen. This goes way beyond mere scanning: The dots are arranged so the pen knows precisely where it is located on the paper at any given time. You can tap icons on the right side of the paper to change marker color and width, draw simple shapes, switch to an eraser, or instantly access Undo and Redo commands. You can also tap to add a new page or navigate existing pages.

The system is slick, precise, and so simple a 5-year-old instantly took to it during testing. Saved files go to the transceiver instead of the host PC, so they're always with you. When you're finished, you can easily export the results of the session to a PDF or PowerPoint file and then email them. It's also possible to print directly from a session to make quick handouts.

The only real downside to this system is the paper. No method of printing new sheets is included, so you're forced to buy refills ($12.99 per 48-sheet pad) once the samples in the kit are used up. Of course, this may be less expensive overall than buying a special tablet PC or touch-enabled monitor to do the same job, and there's no denying Papershow's ease of use. ▲

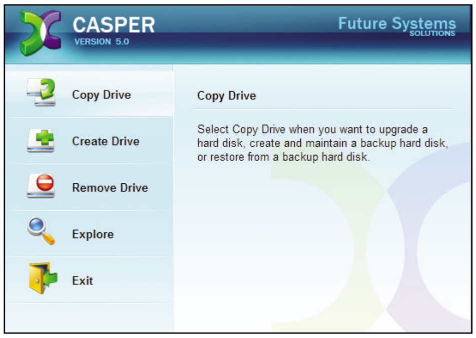
by Tracy Baker

Papershow
$199.99
Canson
papershow.com
●●●●

Future System Solutions Casper 5.0

Most backup software tries to do everything, but Casper focuses on doing one thing as best as possible. Namely, cloning an entire drive and keeping the cloned copy updated so that disaster recovery after hard drive failure is a snap.

Whether you use the 1-Click Cloning feature to instantly back up an entire drive or dive into the scheduling options to tell the software when to update the cloned copy, getting from A to B takes just a few clicks and very little time. The interface is as straightforward as any we've seen, but there are plenty of options if you want to bypass the default settings and tweak things to your liking. These include things such as adding file or folder exclusions, eliminating warning messages (for example, the software detecting that backup performance has degraded), and adjusting performance throttling settings so background cloning doesn't steal resources from more important tasks.



Copy Drive

Select Copy Drive when you want to upgrade a hard disk, create and maintain a backup hard disk, or restore from a backup hard disk.

Another nice thing about Casper is that it's fast. Although the initial cloning can take a long time, as you might expect, updates to the cloned copy don't take long at all because the software keeps track of what's changed and updates it incrementally instead of recloning the entire drive from scratch. All backups are automatically verified for accuracy, and scheduling backups is easy, making this true set-it-and-forget-it backup software.

One thing to bear in mind is that the software does not create a proprietary image of the hard drive, compress data, or encrypt it. This is bad if the backup drive is stolen or compromised, but the good part is that if your original hard drive ever fails, you can swap in the clone drive and quickly recover your system. No boot discs, no lengthy data extraction from an encrypted volume, none of that—just mount the drive, and you're back in business. Even if you use a dual-boot setup (Windows only), it will remain intact if you backed up the drive using Casper. It's simply great hands-off ghosting software. ▲

by Tracy Baker

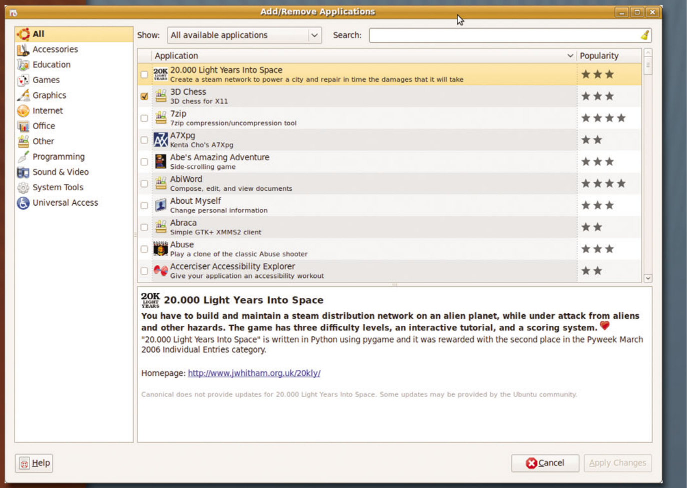
Casper 5.0
$49.95
Future System Solutions
www.fssdev.com
●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Open Sores

Exploring Ubuntu, Part 2: Installing Applications

Last month, I introduced Ubuntu and pored through the OS, discussing its organization, features, and pre-installed tools and applications (of which there are many). This time around, all I wanted to find out was how easy or difficult it would be to install applications. Most of us have been installing applications on our computers since we first learned the DOS command prompt, so this should be an easy one, right?



	Application	Popularity
☐	20.000 Light Years Into Space Create a steam network to power a city and repair in time the damages that it will take	★★★
☑	3D Chess 3D chess for X11	★★★
☐	7zip 7zip compression/uncompression tool	★★★★
☐	A7Xpg Kenta Cho's A7Xpg	★★
☐	Abe's Amazing Adventure Side-scrolling game	★★★
☐	AbiWord Compose, edit, and view documents	★★★★
☐	About Myself Change personal information	★★★
☐	Abraca Simple GTK+ XMMS2 client	★★
☐	Abuse Play a clone of the classic Abuse shooter	★★★
☐	Accerciser Accessibility Explorer Give your application an accessibility workout	★★

20.000 Light Years Into Space

You have to build and maintain a steam distribution network on an alien planet, while under attack from aliens and other hazards. The game has three difficulty levels, an interactive tutorial, and a scoring system.

"20.000 Light Years Into Space" is written in Python using pygame and it was rewarded with the second place in the Pyweek March 2006 Individual Entries category.

Homepage: http://www.jwhitham.org.uk/20kly/

Canonical does not provide updates for 20.000 Light Years Into Space. Some updates may be provided by the Ubuntu community.

The Add/Remove repository is the easiest way to install applications in Ubuntu.

Packages & Package Managers

Like any software installation, Linux applications require packages, or groups of files that are required for the program to run. There are two kinds of Linux packages: source and binary. They're essentially the same thing, in that they both contain the source code necessary for an application to install and run, except that a binary package contains additional code designed to work on a particular computing architecture.

Linux has package managers and repositories. Repositories have a number of different monikers, including "software channels," "software catalogs," and "sources." Repositories store all available packages in their respective channels. The available channels for Ubuntu are Main, Restricted, Universe, and Multiverse. There are other third-party repositories you can track down, as well, although you may experience some installation and performance problems with them, as they're not necessarily designed for Ubuntu.

Package managers take care of the business of downloading and installing packages maintained in the repositories. There are several package managers available, but Ubuntu has a couple of thoroughly useful ones onboard by default.

Package Manager Installation

One of the easiest ways to install applications in Linux is via the Add/Remove tool (one of the preloaded packet managers). There are hundreds of programs catalogued in the Add/Remove area, usually several for every conceivable computing application. To access them, just click Applications and then click Add/Remove.

When the Add/Remove window appears, you can browse all available applications by scrolling through them, narrowing your browsing by application type (such as Accessories, Games, Office, Sound & Video, and more), or searching for specific applications.

To search, first click the drop-down menu next to Show at the top of the window and decide if you want to search all available applications, all open-source applications, Canonical-maintained applications (note: Canonical makes and maintains Ubuntu), third-party applications, or just the applications that are already installed on your computer. After you've made your selection, enter a query in the Search field.

When you locate an application you want, just check the box next to it. Repeat this box-checking for as many applications as you want. When you're finished, click Apply Changes at the bottom right of the window, click Apply when the new dialog box appears, enter your password if prompted, and wait for the installation to finish. That's all there is to it, and it's a beautiful thing.

Another package manager built into Ubuntu is the Synaptic Package Manager. Installing applications from here works in the same way; one difference is that Add/Remove tends to have more applications—such as games and productivity programs—while Synaptic Package Manager is brimming with libraries, plug-ins, codecs, and other sundry bits of code you need to make your programs run.

For example, if you wanted to install a photo-editing application, you would probably head over to Add/Remove, whereas if you needed a codec to run an audio application, you would likely hunt for it in Synaptic Package Manager.

To use Synaptic Package Manager, click System, point to Administration, and then click Synaptic Package Manager. Scroll or search for an item, just as you would in Add/Remove, check the boxes next to the items you want, and click Apply when you're ready to install them all. When the dialog box appears, click Apply again, and wait for the magic to happen.

Hey, It Works Like Windows Sometimes!

You can install some applications just like you would in Windows or Mac—that is, just double-clicking an executable file, clicking through a setup screen or two, and calling it good. The Linux version of an executable file is a .DEB file. You would most likely encounter a .DEB file if you downloaded an (uncompressed) application from the Internet instead of locating it in a packet manager.

For example, I decided to install Skype. (Any bets as to whether Skype actually worked on my Linux system?) I visited the Web site and downloaded the Linux version to my Desktop, located the .DEB file, and double-clicked it. A dialog box appeared with details about the package, including a description, the version and maintainer, and all included files. I clicked Install Package, entered my password, and waited for the package to install. Easy as pie.

.BIN Laden

I tried to install Google Earth the same way I did Skype; I figured the package would come to me as either a .DEB file or as a tarball. Instead, it was a .BIN file.

After a bit of poking through forums, I came to the sad realization that I was going to need to use the Terminal to install this sucker. Google Earth isn't really worth the trouble to me, but apparently all Linux users need to learn the Terminal at some point anyway, so I bit the bullet.

The Terminal is a powerful tool. To open an instance of the Terminal, click Applications, point to Accessories, and click Terminal. The interface looks like a simple text editor and has a command prompt. From the Terminal, you have total control over your system, but you need to know mountains of commands in order to execute all those controls.

Once I found a decent how-to guide, the experience wasn't too painful, however. What you have to do with a .BIN file is convert it to an executable file. To do this, I opened Terminal and entered **cd Desktop** to get to my Desktop directory, where the .BIN file was located. Then, I checked to make sure I was in the right file directory by typing **ls**, which displays a list of everything in that directory.

I typed **sudo chmod +x GoogleEarthLinux.bin** to change the .BIN to an executable file, entered my password when prompted, and then entered **./GoogleEarthLinux.bin** to run the executable file.

A dialog box popped up asking where I wanted to install Google Earth and giving me some additional information, such as the size of the file and how much free space I had on my hard drive. I clicked Begin Install and waited for the installation to finish.

Tarballs & You

A tarball is a compressed archive, essentially the same thing as a ZIP file | in Windows. Before you can install the application inside, you need to decompress the archive. These steps are simple in Ubuntu; just download an application from the Internet and save it somewhere (let's say, on the Desktop). Right-click the tarball and select Open With Archive Manager. When the window appears, click Extract and choose a location for the program's folder.

This is where the easy part ends. Linux applications all have dependencies, which are libraries and codecs and the like, that are necessary for the programs to install and run properly. This is nothing new to Windows and Mac users—every program you've ever installed has "dependencies." Typically, users don't need to mess with locating those extra files when installing applications, as the developers will include all the necessary dependencies when building the installation package.

Of course, sometimes the developer misses something, or the installation is slightly out of date and needs an additional something or other. We've all had to track down this or that file on occasion to get a program running properly.

Ubuntu, like most recent Linux distros, eliminates the need to hunt for dependencies when installing applications, thanks to the package managers and repositories. However, when programs come in tarballs, there are often dependencies missing, and that's where installing an application can get troublesome for users very quickly.

There are simple Terminal commands you can use to figure out what dependencies you're missing, and often you can go to Synaptic Package Manager and find what you need. When you think you have everything you need, type **./configure** into the Terminal to compile the package and hope for the best. This stage can require some trial and error, as it's easy to overlook something you need or get the wrong version of something. Further, there may be many dependencies you have to track down, which can be tedious and time-consuming. If you have the patience to get past this part of the process, and after running the Configure command you receive a prompt to do so, enter make to compile the program.

This sort of thing, while not impossible or even necessarily especially difficult, is likely a reason why so many people get frustrated with Linux and go back to Windows or Mac. You can quickly find yourself elbow-deep in Terminal commands, endlessly cruising forums to find tips on what to do, and getting frustrated—all to install a program. It makes one want to stick with whatever applications are available in the package managers exclusively. ▲

by Seth Colaner

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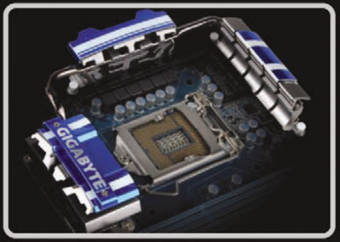
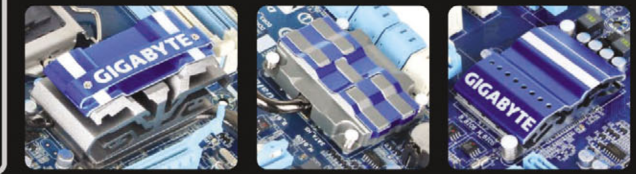


SLEEK THERMAL DESIGN



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Location, Location, Location

Geolocation Brings The Web To The Next Dimension

I am standing on a street corner in Times Square, New York City, with my iPhone cam looking down the main thoroughfare of Broadway. As I pan the camera around, little boxes of text and ratings information pop up over the stores and restaurants that come into view. These opinions were created by a vast network of people, and they pour onto the phone to annotate every location I choose to face in this crossroads of the world. I can tap any of these pop-ups to get more detailed information or a direct link to call the business. I can even send a compliment to any of the users who have reviewed the place. By knowing where I am and where my gaze is pointed, this application, named Yelp, can layer onto the real-world, Web-based, factual information and the sum total of user-generated knowledge from social networks.

Welcome to the geolocation revolution.

For the people developing the next generation of digital products and services for us, geolocation (knowing precisely where an Internet user is in the world) changes just about everything.

"It is the confluence of space and time," says Nihal Mehta, CEO of buzzd (buzzd.com), an LBS (location-based service) that tells you which hot spots in your immediate vicinity are generating the most "buzz" among users. "No application on any platform has been able to bridge those two dimensions together, and that is why everyone is so excited."

Online search helped people find what they were looking for from the desktop. Tools such as social networking and social content helped tell us what people thought about those products and places. But geolocation pushes out all of that information to the person where they are, filtering the Web and giving it context so that it is relevant precisely to where you stand at a specific time.

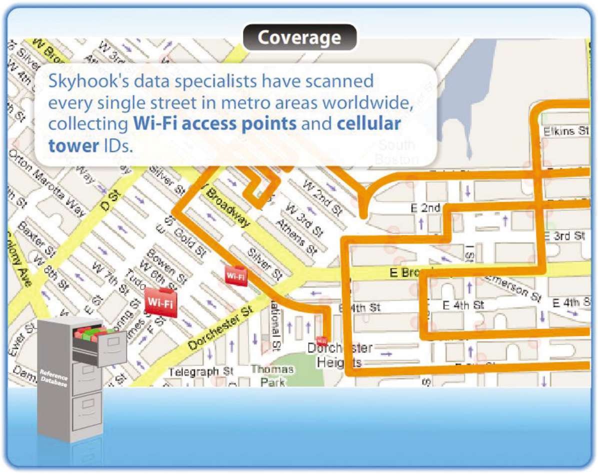
Although some of the sexiest LBS applications are evolving on mobile handsets, it's important to note that the entire Web is becoming more location-aware. Google is working frantically to add location sensitivity to all of its services. The new Latitude (www.google.com/latitude) service lets a user link her cell phone geolocation data to an online map and share that information with a circle of friends online. Now you can broadcast to everyone you know where in the world you are at any time. A new Google Gears API lets third-party Web and mobile Web developers to retrieve and use a visitor's physical location in order to filter to them the most relevant content.

Twitter recently announced it would release an API for third-party developers that would include the Tweeter's physical location if the poster allowed it. Conceivably, a user could search for tweets occurring in real time in their immediate vicinity. Earlier this year, Firefox 3.5 became the first major browser capable of retrieving location information from a user's PC and passing it on to a Web site you are visiting.

As more users connect to the Web via laptops and smartphones, locating the user with eerie precision is not a big technical feat. GPS is the technology that first comes to mind, of course. Market research firm iSuppli contends that by 2011 virtually all smartphones will have GPS capability. While many cell phones have had these chips for several years already, the release of the iPhone 3G last year helped supercharge the market because so many iPhone applications (including its native Google Maps) now use geolocation to streamline everyday operations, such as search results.

But GPS is slow and often impeded indoors. Cell phone networks can use cell tower triangulation and relative signal strength to determine where your phone sits among its towers. In fact, your built-in Wi-Fi card, or even your home's router, is fast becoming one of the best ways that a wider variety of hardware can be located.

Skyhook Wireless (www.skyhookwireless.com) is a company that has mapped the location of over 100 million Wi-Fi access points and cell towers worldwide, probably including your home router. It sends drivers down every street and highway it can find to record the names and locations of Wi-Fi signals so that laptops and cell phones can be pinpointed within a second with staggering accuracy (10 to 20 meters). Skyhook Wireless partners with Apple iPhone and various application developers to provide location information that software makers can build on.


Coverage
Skyhook's data specialists have scanned every single street in metro areas worldwide, collecting Wi-Fi access points and cellular tower IDs.
Wi-Fi
Broadway
Dorchester St
E Broadway
E 2nd
E 4th St
Telegraph St
Thomas Park
Dorchester Heights
Elkins St
Reference Database

Skyhook Wireless, which provides Apple with geolocation information for iPhone applications, uses a combination of GPS, cell tower signals, and a map of Wi-Fi access points to find your location.

Where You Are Going

Some of Silicon Valley's hottest startups are LBS innovators: loopt (www.loopt.com), Aloqa (www.aloqa.com), foursquare (foursquare.com), buzzd, Yelp (www.yelp.com), Whrrl (whrrl.com), and others are exploring new ways to leverage "place."

"Geolocation is just one element of the broader human context," says Sanjeev Agrawal, a former Google executive and now CEO of Aloqa, a mobile service that proactively notifies users of places, events, and people close to them. "We think this notion of geolocation is interesting, but it will be a commodity fast. It is what you do with it."

Driving navigation systems are useful, and streamlined search results are efficient, but this next generation of geo-aware developers believes that the location layer becomes powerful when software can pull in Web-based information, social networks, and a deeper knowledge of the user's own wants and needs.

> "Geolocation is just one element of the broader human context. We think this notion of geolocation is interesting, but it will be a commodity fast."
>
> -Sanjeev Agrawal, CEO of Aloqa

"Knowing where someone is is no big deal," says Agrawal. "Do you know how fast I am going? Am I in place or in a car? Where are they going? Are they close to home? What are their preferences?" The Aloqa application, which is available in the Android and BlackBerry mobile marketplaces, lets users subscribe to types of events, stores, restaurants, and more. When the user enters a new geographic zone, the program refreshes itself with the most relevant offers in that geographic area to the user. Aloqa members can even have their Facebook friends included in the system, and if both parties opt into the service, Aloqa can alert them when both are in the same zone.

Agrawal believes geolocation transforms the Internet from a resource into a service. "We are converting the phone from a pull-based search metaphor to a push-based delivery and recommendations metaphor," he says.

The World Is A Game

Among the hottest geolocation properties in the market, foursquare is a location-based friend finder that makes tracking your real-world activity a contest. "Initially, it started as an experiment in turning nightlife into a game," says founder Dennis Crowley. "Now it turns life into a game." Users "check in" to the system on their iPhone or Android phones and declare what they are doing to receive badges for kinds of activities.

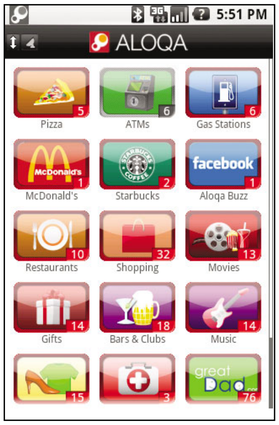
"We built a system that rewards you for trying new places or for traveling to new cities. You amass points and 'badges' for doing things like staying out late on Tuesday night doing karaoke." The addictive competitiveness of the system lures people into checking in more often, recording their thoughts about the places they visit, and, ultimately, building a database of people and reviews about activities and places.

The power of the geolocated crowd can be enormous. When Vancouver, Canada, residents asked to have the service cover their area, foursquare couldn't afford to populate the database with local listings. "So we just asked the users in Vancouver to add the venues themselves," says Crowley. "In a week, we had 1,000 people and 2,000 places. It's pretty much covered now." One of the popular and lucrative twists in the foursquare model is the emergence of "mayors" in different locations. The person who checks in most often gets this special status, but others can knock mayors out of office if they check in more often.

Crowley has started to build a business model around this concept, with local businesses giving away coupons and special offers to their more frequent foursquare visitors and mayors. "We have 40 venues in 22 cities that have volunteered to give out freebies," says Crowley. "That is what we are really going after."

The wisdom and the power of the geolocated crowd is also in evidence in buzzd, the service that shows people how much social "buzz" there is around venues in their immediate vicinity. Buzzd actually pulls in location-based discussions from and about given venues from Twitter, buzzd itself, and other social networks to gauge which hot spots are, well, hot.

"We're aggregating other location-based networks like Whrrl, foursquare, loopt, and Brightkite to bring it into our service and calibrate it with the Buzz Meter," says CEO Mehta. "After the MTV Video Music Awards here in Manhattan, I used the app to rank all the venues based on Buzz and found out what post-show parties and venues had Jay-Z or Avril Lavigne."



Aloqa is a location-aware notification system that alerts you when people, places, and events of interest are in the vicinity.

Like foursquare's Crowley, Mehta believes that geolocation isn't just about location-aware search services. The real promise here is in reversing the polarity of the Web as we know it. Once a network knows where you are, you shouldn't have to search for what you like. The system should be there to push the most relevant information out.

Serving Or Stalking?

It almost goes without saying that that LBS tools raise the specter of security and privacy breaches. When Twitter announced its new geolocation API and Google opened its Latitude service, many in the industry saw the potential for serious abuse. Social network sharing of experiences and sentiments is one thing, but what happens when your current location is automatically made part of your interactions with the network?

Location-aware friend-finding may seem cool, but have its users thought through the unintended consequences? An innocent Twitter post or Latitude tracking designed to locate your friends nearby may also be revealing to a burglar that you aren't at home, for instance. Most of these services have controls that let users turn tracking on or off, but many critics worry that users may not remember to do so. Suddenly, a service meant to find buddies becomes a stalking tool for someone else. And geolocation just offers hackers another target. Imagine a stealth program that turns geolocation options on without the user's knowledge.

Criminality aside, geolocation could also become a boon for marketers and a bane for users. Imagine walking down a busy city street or sitting in a café, only to have your laptop or phone besieged by unwelcome pop-ups. This would be real-world spam of the most irritating sort.

"Although the new location-based services may be useful to consumers, they also represent an entirely new advertising medium, one with potentially grave privacy implications," says the Center for Digital Democracy in a statement earlier this year. The privacy watchdog warns that consumer database companies are already partnering with LBS services with the ultimate goal of tracking people in stores and pushing coupons and ads to them as they move from aisle to aisle. "Location-based targeting represents yet another way that marketers will be able to capitalize on mobile users' personal information without giving thought to the interests of consumers themselves," the group argues.

Most of the early providers of LBS products insist they are very sensitive to the privacy and security implications of this new wave of digital media. Mozilla's new location-aware Firefox browser asks the user's permission before passing any location information to a third-party Web site, and the company says in its policy statement that it never shares location information without a user's permission. Even some LBS creators demur at models that propose pinging your phone if a friend passes near you in a bar. This kind of persistent location awareness is bound to backfire, says buzzd's Nihal Mehta.

"I think this is the wrong approach that will violate all privacy concerns. It's like a stalker's dream."

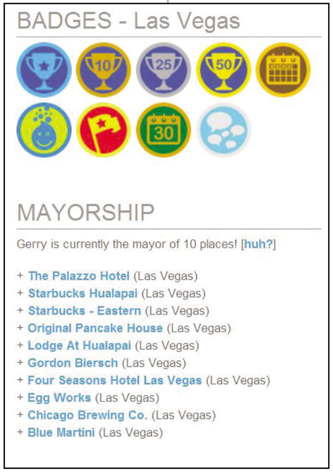
Geolocation Finds Its Place

Both LBS services and the privacy considerations they raise still are in their infancy. The overwhelming majority of cell phone and laptop users remain unaware that their devices can be located easily by multiple methods, and very few so far have opted into location-aware services other than the basic directional tools available from in-car navigation systems. "There is not a ton of demand," admits Mehta, "but there is a ton of supply."

The real promise of LBS is in turning the Internet into a location-aware, personalized concierge. If your network of friends and Web services all know what you like and where you are, then they can filter and push only those opportunities and people nearby that matter to you.

But that kind of personal, contextual, digital valet requires a new level of intimacy. Users will need to opt into programs that know who and where they are. With great value comes great risk. "All these companies have their own take on [geolocation], and they are innovating at similar rates," says Mehta. "One of these guys will figure out how to give the user that experience without the backlash." ▲

by Steve Smith


BADGES - Las Vegas

MAYORSHIP

Gerry is currently the mayor of 10 places! [huh?]

+ The Palazzo Hotel (Las Vegas)
+ Starbucks Hualapai (Las Vegas)
+ Starbucks - Eastern (Las Vegas)
+ Original Pancake House (Las Vegas)
+ Lodge At Hualapai (Las Vegas)
+ Gordon Biersch (Las Vegas)
+ Four Seasons Hotel Las Vegas (Las Vegas)
+ Egg Works (Las Vegas)
+ Chicago Brewing Co. (Las Vegas)
+ Blue Martini (Las Vegas)

The hot new location-aware social network foursquare turns location into a game, awarding badges for many types of activities and giving "Mayor" status to users who frequent certain venues most often.

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by Rob “CmdrTaco” Malda

augment.txt

In the last two decades, we’ve witnessed a revolution in gadgetry.

When I was a kid, the most powerful device you could pack in your pocket was a Game Boy. With a directional pad, a couple of buttons, and a tiny grayscale screen, you could play your way through a minimized version of Super Mario Bros. But this device was pretty dumb.

Since then, the computational power in your pocket has grown many times over. The Game Boy DS, the Android G1, and the iPhone each have more computational power than computers did a decade ago. More important than that, however, is the fact that these new devices have inputs beyond buttons for up and down. Today’s modern pocket powerhouses have GPS, accelerometers, compasses, and cameras. They are bursting at the seams with data, much of which is just being wasted.

You put all of this together, and you finally have the potential to create a useful first draft of an augmented reality that is worth paying attention to. It's not like we haven't tried before: HCI nerds have been building strange contraptions to integrate computing power into real life forever. For a good time, simply plug 'wearable computing' into Google and behold the ludicrous imagery. Some of it is meant to be aesthetic. But the real, hardcore reality augmenting efforts have yielded outfits completely out of step with actual reality. Good luck walking with the bulky helmets, wrist keyboards, and fanny packs filled with batteries.

But you don't need to run around looking like a Borg to get an excellent first draft. You can aim your camera at something and your little gadget knows where you are within a few feet and what direction you are facing. From there, it shouldn’t take all that much to tell you what it is you are seeing.

Of course, this is only the first step. As the spatial information we collect becomes more accurate and photo processing becomes more sophisticated, we may get to a point where you could hold up your camera and see useful information superimposed over the world on your screen, all in real time.

Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org. He spends his time fiddling with electronic gizmos, wandering the ’Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.

Imagine pointing a device at the Washington Monument and having the gadget instantly call up the monument’s height and weight, the year it was built, and any other useful information available in a Wikipedia article. What about pointing your phone at an intersection street sign and seeing a map superimposed in 3D over the on-screen image? Or taking a picture of the front door of a restaurant and getting its hours of operation, menu, and reviews of its summer entrees as well as directions to the cheaper place around the corner that has better reviews.

Some of this stuff is really difficult, but the more information you have, the more you are able to reduce the data set of information you are looking for. Sure, there are a thousand national monuments, but if your device knows you’re at a certain latitude and longitude and facing a particular direction, that list gets very small. Recognizing a generic doorframe might not be practical, but detecting the address number and combining that with the names of the businesses within a couple-block radius lets you get close with only minimal computation.

Science fiction has trained us to think that augmenting reality involves a clunky headset that we stare through at the world, but that is very impractical. Shrinking that concept so that the data is called up on a contact lens is somewhat of a holy grail, but for now that is well beyond our grasp. But your phone already has the sensors necessary to deliver up most of the benefits of augmented reality, and the Internet has much of the knowledge. Google Maps provides a grid to map the world onto. Flickr gives you photos to help you translate what things people are seeing at various points on that grid. And Wikipedia lets you find out what it all means. Of course, the next step would be powerful facial recognition, but I’ll settle for one thing at a time. ▲

Contact me at malda@cpumag.com

Yeah, we know you have blogs to post, video to encode, reports to write, and code to compile. We do, too, but you have to take a break once in a while (and maybe blow some stuff up). That's why each month we give you the lowdown on what to expect from the latest interesting PC and console games.

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www.xbox.com/halo

Master Who? — by Chris Trumble

After Halo 3 launched in September 2007, the gang at Bungie were asked in several interviews what was next, and in a couple instances they hinted that we'd soon start to see some new things in the Halo universe, including possibly Halo games without the Master Chief. Despite having played a bit as the Arbiter, it was a little weird to think of playing a whole game as someone other than Spartan 117. But here we are, running around the streets of New Mombasa without him, and we're having the time of our lives.

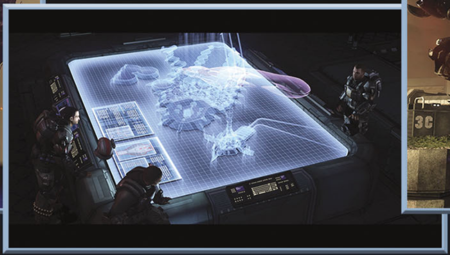
In Halo 3: ODST, you get to play as several Orbital Drop Shock Troopers, or "Helljumpers," as they are otherwise known. These guys aren't 7-foot, half-ton, bio-engineered gods of the battlefield like Spartans, but they're the next best thing. Helljumpers are the UNSC's elite special-forces troops, and they get their name from their deployment method, which essentially consists of them being fired like guided missiles at their targets from space cruisers in low orbit.

In the game, you get the opportunity to play as several ODSTs, but your main character is the unnamed Rookie, a new member of an ODST squad led by Gunnery Sergeant Buck, a character who looks and sounds a lot like Nathan Fillion ("Firefly," "Serenity," "Castle"). (If you listen carefully, you'll even hear Buck utter a bit of "Firefly" slang.) Buck's unit is under orders to launch an assault on the Covenant carrier hovering over the city (remember that one time, in New Mombasa?), with an added twist: You have to take along a Naval Intelligence officer, call sign Dare. If you're thinking that there might be more to the story because a spook is coming along, you're probably right. During the launch, though, the carrier jumps away, causing all manner of havoc with jump trajectories, etc., and Buck's/your unit ends up scattered all over the city. Your mission is to find the rest of your unit and get out of the city alive, and as you play as each of the members of your unit and see what they saw before you . . . saw them, the story unfolds.

Technically, this is the best Halo game yet. That the game's video and audio quality are top-shelf pretty much goes without saying at this point, and in addition to playing a new character, you get some new toys to play with, as well. The ODSTs have improved HUDs with night vision and friend-or-foe recognition, they tote around a new silenced SMG and a new SOCOM variant of the magnum (yes, the scope is back!), and you also get interactive maps with real-time enemy tracking.

The game is also very good in terms of its narrative and contribution to the Halo universe. ODST has a darker look and tone than previous games in the series, and is a nice change of pace. And, because it's Halo, multiplayer options are plentiful and fully polished. Firefight mode is especially cool; it's an amped-up, survival-style extension of Halo 3's 4-player cooperative mode in which Bungie's infamous in-game skull modifiers activate periodically to ratchet up the difficulty.

Because the multiplayer disc contains 21 previously released maps and three new ones, you can make the argument that there's not as much new content in ODST as there was in Halo 3, and that's probably fair. But every bit of the new content you get is brilliant; this is a must-have title for Xbox 360 owners. ▲



BATMAN
ARKHAM ASYLUM

$59.99 (360, PS3); $49.99 (PC) • ESRB: (T)een
Eidos Interactive • www.batmanarkhamasylum.com

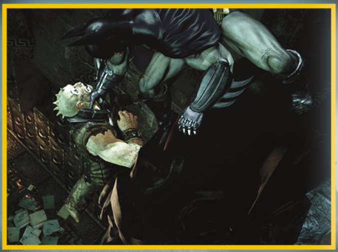
The Dark Knight Gets Justice
— *by Dr. Malaprop*

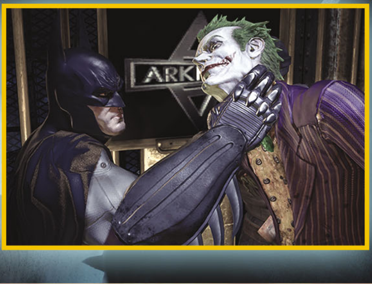
The extended CG introduction starts in the Batmobile. The Joker has been captured a bit too easily, and Batman is transporting him to Arkham Asylum. Oddly, the Joker doesn't seem torn up about his incarceration. The why becomes obvious: His capture is an elaborate plan to take over the asylum with Batman trapped within the walls as the guest of honor.

Combat begins almost instantaneously; as Batman, you'll incapacitate but never kill. What begins simplistically transitions to complex-looking combat without the complexity. It all meshes beautifully. Basic attacks, counterattacks, and combos look like an elegant but violent dance. You'll learn new moves as you progress that can be applied seamlessly in combat simulation against numerous simultaneous enemies.

Batman is not immune to bullets, so it's important to be stealthy when the situation requires it. He can swing up onto gargoyles at the ceiling level to pick off individuals in a variety of creative ways, including stringing enemies up by the feet (our favorite), setting explosive traps, and so forth. Watching enemies going from calm to sheer panic will make you smile. The title's pacing eases transition between the core game mechanics of combat, sleuthing, and stealth. Additionally, there are riddles and inmate interview tapes scattered around the asylum that encourage exploration and flesh out the story. Switching to Batman's Detective vision mode may lead you to miss out on the gorgeous graphics (with excellent PhysX support on the PC) but lets you view hidden items and enemies through walls, destructible surfaces, and more. It also speeds up the stealth, which we liked.

This is the top-tier sleeper hit for 2009 and the best Batman game ever made. Voice acting is top-notch, and Mark Hamill's Joker is, as usual, superb. Animation and graphics look best on the PC but are excellent across all SKUs. Finally, Batman gets videogame respect. ▲





THE BEATLES ROCKBAND

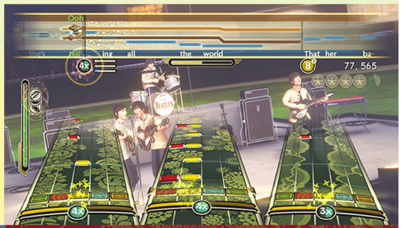
$59.99 (360, PS3; Wii); $249.99 (Bundle)
ESRB: (M)ature
Electronic Arts
www.thebeatlesrockband.com

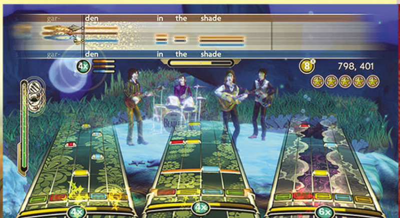
The Fab Four Come Home — *by Dr. Malaprop*

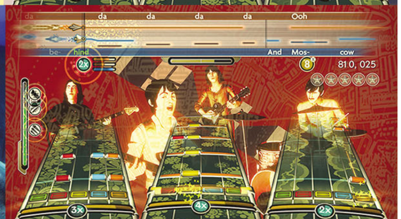
As implied by the name, The Beatles: Rock Band is a Beatles-themed Rock Band game. It features 45 songs. (By comparison, Guitar Hero 5 nearly doubles the song list.) Additional downloadable Beatles songs are available for a price, and by the time you read this, both the "Abbey Road" and "Sgt. Pepper's Lonely Hearts Club Band" albums will be available. These downloadable albums and songs will work only with The Beatles: Rock Band.

The tracks span major events in the career of the band. In-game locations include the Cavern Club, "The Ed Sullivan Show," Shea Stadium, Abbey Road Studios, and the Apple Corps HQ rooftop. These are more than venues. The locations take on heavily stylized cinematics and dreamscapes that make the songs come alive. It has a lot of character, creativity, and (rubber) soul. For those not watching the notes stream by, the visuals are very attractive. A big addition to the genre is the ability to connect three microphones to have up to six members in your band thanks to multipart vocal harmonies. That's something we'll see more of in the future.

The Beatles: Rock Band doubles as a partial documentary of the group. Rare photos and video footage document the band's career. Completing songs with 3- and 5-star level ratings unlocks photos that are well worth looking through. This is a game that's as accessible as you can get from a rhythm game that isn't Simple Simon. And although 45 songs may seem limited, it's obvious that the developer has poured a lot of love into making those 45 songs look like more than just a money-grubbing theme pack. This is the perfect rhythm game to play with anyone in the family across all skill levels of play. ▲







Fight For Your Right To Party Play — *by Dr. Malaprop*

$59.99 (360, PS3, Wii); $39.99 (PS2)
ESRB: (T)een
Activision
hub.guitarhero.com/games/gh5

As soon as Guitar Hero 5 loads, you'll discover how easily anyone can jump into the songs playing at the title screen, thanks to the new Party Play feature. Pick up midsong with any instrument or leave, and the game handles it all with aplomb. Mind you, this is before getting to the core game menus. Delve deeper and you'll find that numerous interface tweaks enhance the overall band experience.

You can import many of the GH World Tour and GH Smash Hits songs in addition to the 85 master tracks available out of the shrink wrap. Graphics and animations have been noticeably improved. AI boss battles are history, but you can step into the shoes of Carlos Santana, Kurt Cobain, Johnny Cash, and Shirley Manson.

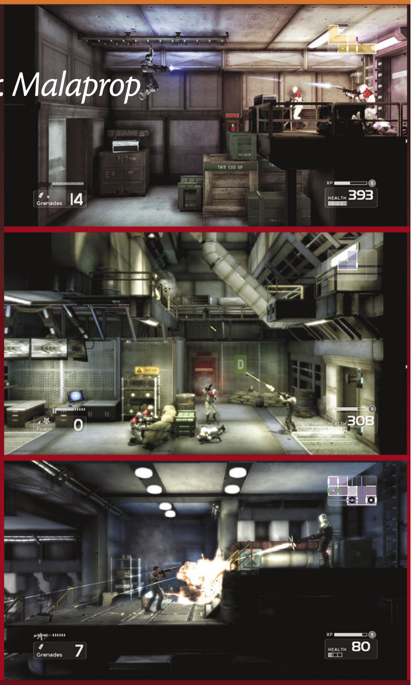
GH5 in some ways feels like a product with little soul when compared with The Beatles: Rock Band, but it's arguably the strongest game in the Guitar Hero series. There are enough tracks here to please a variety of tastes, making GH5 the ultimate rhythm party-friendly game. ▲

Epic 2D With The Unreal Engine — *by Dr. Malaprop*

$15 (360)
ESRB: (T)een
Microsoft
www.xbox.com/en-US/games/s/shadowcomplexxbla

Classic 2D 16-bit-era games, such as Metroid and Castlevania, inspired Chair Entertainment's Unreal Engine-based Shadow Complex, set in the same world as Orson Scott Card's "Empire" novel series. Fortunately, there's no need to be familiar with the source material to enjoy the game. As Jason Fleming, you're off for some spelunking with your new girlfriend, Claire. Unfortunately, you stumble across a paramilitary organization's secret base as it prepares to wrest control of the United States. Claire is captured, and on the way to save her, Jason will get new weapons and find power armor that will let him take on the powerful paramilitary troops. Gameplay pans out in classic 2D platformer fashion, but your enemies can pop out on the Z axis. Of course, you're able to target said enemies on your way to rescue Claire. There's a lot of backtracking, but gameplay never feels repetitive.

At $15, Shadow Complex is one of 2009's best values. It doesn't require old-school platformer nostalgia to be enjoyed, and it exudes quality. Gameplay has been fine-tuned, and the controls are accurate. You can complete it in less than eight hours. Fortunately, there's ample reason to play through one or two more times thanks to exploration, Achievements, and collectibles. ▲



New Old-School FPS — *by Dr. Malaprop*

Before Doom, there was Wolfenstein 3D. The game's character, B.J. Blazkowicz, has endured a long time. And that's something you'll need to do—endure a few hours of gameplay before this new Wolfenstein jumps from generic to good. B.J. is out to scuttle Nazis and their plans to harness supernatural powers. These powers can be found in a green aura-soaked paranormal alternate dimension known as the Veil, accessed using an amulet you acquire early in the game. This is as old-school FPS as you get, but with new hijinks thrown in for variety. For example, we liked the nonlinear nature of the hub world but tired of fighting our way through it on the way to mostly linear missions.

The Doom 3 engine that powers the game has begun looking long in the tooth. Multiplayer options are available, but you would do better elsewhere. Wolfenstein is recommended to run-and-gun fans but will likely be overlooked this holiday season. That's a pity, because we started having a lot of fun a few hours into the game. ▲

$59.99 (360, PS3); $49.99 (PC)
ESRB: (M)ature
Activision
www.wolfenstein.com

MARVEL ULTIMATE ALLIANCE 2

$59.99 (360, PS3); $49.99 (Wii); $29.99 (PS2)
ESRB: (T)een • Activision
marvelultimatealliance.marvel.com

Gauntlet Of Superheroes – *by Dr. Malaprop*

Ultimate Alliance 2 will appeal to anyone who enjoyed the 2006 original. When played with four real players, we're reminded of the classic Gauntlet arcade game. But this time, there's a strong story, and the interface has been improved. The basic premise of the game surrounds the Superhuman Registration Act, which leads to a division between superheroes—the perfect reason to beat up on other ordinarily "good" superheroes.

The game still entails a heavy button-mashing mechanic, but it introduces a way to match up two of your four team members for Fusion attacks. You can focus these heavy damage attacks on a single target or dish out area damage. It's a nice tweak to the gameplay. Along the way, you will encounter branching storylines that lead the game down different paths. This provides replay value. We liked the ability to swap our team on the fly for variety but were less enamored with gameplay bugs, which we expect will be patched. And, oddly, there's no PC release for the sequel. If you like action-RPG, then this is worth checking out. ▲

Logitech Laser Mouse

Finely Tuned Headshots

Logitech's new G9x Laser Mouse isn't much to look at if you're already familiar with the 2007 G9. Features between the two USB mice are the same with respect to the onboard memory, storage capacity of five profiles directly on the mouse, weight/balance system, and outer shell. In fact, the only easy way to visually tell them apart is the red "X" on the mouse. In your hands, though, it's another story. The 5,700dpi laser sensor noticeably outperforms the original's 3,200dpi sensor. High sensitivity on a large LCD is a boon in gameplay, and you can crank the sensitivity up and down on the fly while in-game.

The caveats are the pricey MSRP and comfort when holding the mouse. It just didn't feel comfortable to us, but we loved everything else about it, both in gameplay and daily use. Find a store that lets you handle a G9x to see how it feels. Logitech has done an amazing job with the G9x, and it achieves borderline perfection with the exception of grip comfort. This piece of hardware is the best of the best as far as gaming mice go, so keep it on your short list when it comes time to upgrade. ▲

by Dr. Malaprop

$99.99 (PC, Mac) • CPU Rating: 4.5/5
Logitech • www.logitech.com

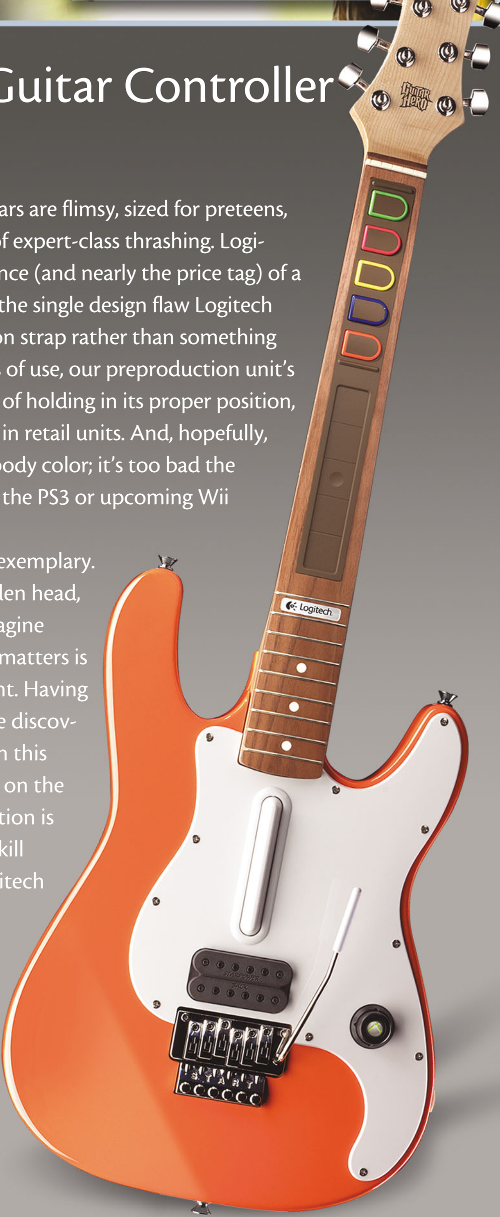
Logitech Wireless Guitar Controller

Rock With The Best

We all know that standard game guitars are flimsy, sized for preteens, and won't withstand many hours of expert-class thrashing. Logitech's dream axe has all the heft and presence (and nearly the price tag) of a Fender Stratocaster. At nearly 6.5 pounds, the single design flaw Logitech made was including a standard, cheap nylon strap rather than something decent and leather. After about two weeks of use, our preproduction unit's whammy bar merely swung limply instead of holding in its proper position, but Logitech assured us this was remedied in retail units. And, hopefully, you 360 guitarists like raging orange for a body color; it's too bad the only way into a black or white model is on the PS3 or upcoming Wii editions, respectively.

Otherwise, Logitech's craftsmanship is exemplary. With the inlaid rosewood fretboard, wooden head, and metal tuning pegs, it's far easier to imagine yourself wailing on stage. Of course, what matters is playability, and Logitech doesn't disappoint. Having some experience playing electric guitar, we discovered that a felt guitar pick worked great on this unit—something we could never make fly on the cheap World Tour axe. The strum bar's action is just firm enough not to bounce back and kill your sustained notes. Up on the neck, Logitech used the same rubber dome technology found in its top-grade keyboards to give the five buttons a softer, quieter action. This took some acclimation, as we spent the first week with constant joint pain from pressing too hard—wannabe rock star job hazard, apparently. When you can't get real blisters on your fingers or your chicks for free, Logitech's guitar is the next best thing. ▲

by Dr. Malaprop



$199.99 (360, PS3, Wii) • CPU Rating: 4.5/5
Logitech • www.logitech.com

Two Times The Convenience

*Hard drive not included

Winners Announced

BLACX Duet

The world's most popular high-volume-data-moving-and-transfer-device BlacX Hard Drive Docking Station has a bigger brother now, BlacX Duet. Two times the hard drive, two times the convenience. Last time we checked, two is still better than one.

Experience BlacX Duet today at www.thermaltake.com

Thermaltake
COOLall YOUR LIFE

twitter.com/Thermaltake

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*Find out if you are one of the lucky winners www.thermaltakeusa.com/duet

DELL RadioShack MICRO CENTER Fry's BEST BUY newegg COMPUSA amazon.com TigerDirect.com ZipZoomfly.com by Barry Brenesal

DESQview

It never fails. Whenever Windows refuses to do something I tell it to, or does it slowly, or absorbs my 4GB mountain of RAM to produce a molehill, a part of my mind reminds me with fondness of a DOS-based multitasker, DESQview. Now, there's no question that modern iterations of Windows accomplish far more than DESQview did 15 years ago, but in its time, the latter was distinguished by the stability, speed, and efficiency with which it got the job done.

DESQview made its debut in 1985, ironically within a few months of the overwhelmingly underwhelming release of Windows 1.0. It ran programs in overlapping, instantly resizable windows, something Microsoft's GUI couldn't do. Still, what really attracted attention was its ability to swap out programs on top of DOS, utilizing a well-known memory quirk in the 80286 chip.

But it was with the introduction of the 80386 that DESQview truly came into its own. It operated in protected mode, affording considerable security against system-wide crashes if a single windowed application froze. True, the memory size of each window was limited by the size of DOS with all your device drivers and TSRs loaded before DESQview even ran; but a good memory manager such as Quarterdeck's own QEMM could efficiently stretch that window by remapping much of its content into the upper memory area (between 640 and 1,024K). The actual number of windows you could run on DESQview was determined by the amount of extended RAM in your system, which QEMM converted into expanded RAM. A 4MB system allowed DESQview to run roughly six programs simultaneously, and an 8MB system could run 12.

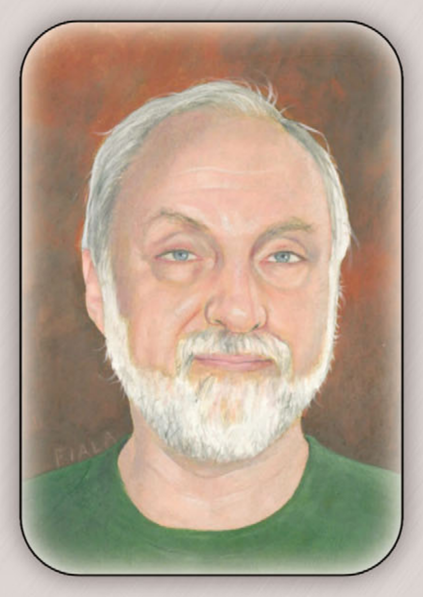
Yes, 12 programs within 8 megabytes—not gigabytes—of memory. It might seem like magic today, but programmers routinely squeezed a staggering amount of functionality into DOS-based programs that existed below that 640K ceiling. They all ran swiftly on DESQview, too. The system only slowed if you opened too many windows for the amount of memory on your system. Then the multitasker would start swapping out background programs onto your hard drive.

Installation and setup was a snap, though you could configure a great deal under the hood (such as loading two shared programs in a single window or defining foreground/background task values) if you preferred that level of control. DESQview's interface was exceptionally easy to work with. The ALT key brought up menu-related functions, such as copying and pasting text, creating macros, and starting new tasks. Its macros would run outside its windowed programs, preventing confusion with macros any of them might possess. This meant you could assign key combinations to application windows. It was a small matter when you only had two or three windows up, but when five or more were running, switching to just the one you wanted at a single, memorized key press was very helpful.

DESQview was not graphical, but a text-based operating system. It could run Windows 3.0 and 3.1 effectively within a window, though, giving you access to graphical programs that ran under those GUIs. In this way, I had no problems accessing Excel, Word, or WordStar for Windows under DESQview, while the load time was only fractionally longer than running Windows as the primary environment. By way of contrast, running multiple DOS-based programs under Windows at the time was a sure invitation to torpid performance interrupted periodically by the thrill of a crash.

The Quarterdeck team didn't respond quickly enough to the editorial hoopla that greeted Windows 3.0, however. DESQview was faster, more stable, and handled memory with far greater sophistication than early versions of the Microsoft GUI, but Microsoft was at that time strong-arming dealerships and wholesalers (through the threat of a so-called "Windows tax" that ultimately led to successful antitrust suits) to sell all their new PCs with Windows preinstalled. This was not a battle Quarterdeck could win, and in any case DESQview/X, its own GUI, appeared too late. It's considered bad luck to enter a horse in a race that has already been won.

Still, if you ever get a shot at witnessing DESQview in operation on a vintage computer setup, don't miss it. It was truly cutting-edge in its day, and for some time afterward. ▲



Barry Brenesal has written more than 1,000 published articles and reviews on electronic technology since 1987. His first personal computer was a Radio Shack TRS-80 model 100. It was last seen functioning as a boat anchor.

Wax nostalgic with Barry at
barry@cpumag.com

Software Tips & Projects

Tame The iTunes Beast

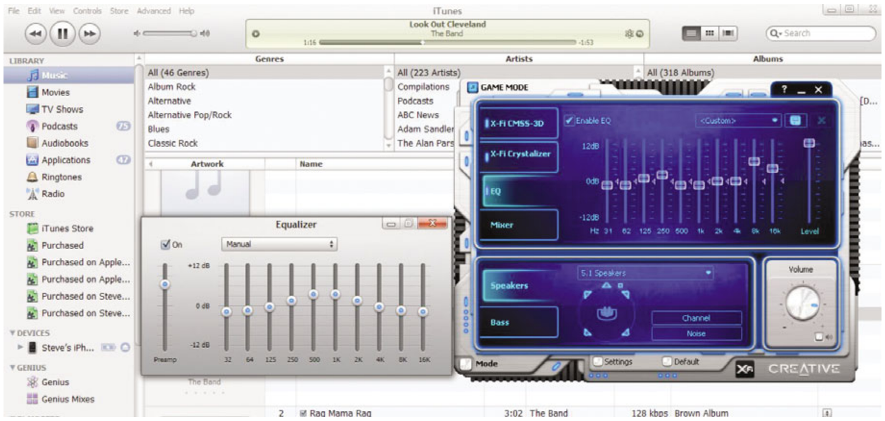
Did you recently get a new iPod touch, nano, or iPhone? If so, then we're here to offer a few tips that can help you fine-tune iTunes, a media player and store that can be as powerful as it is sluggish and frustrating. These performance tweaks and shortcuts are intended for those of you using iTunes 9.0, although some still apply to older versions.

Hurry Up & Wait

For many people, iTunes is the most sluggish software that's commonly used on a daily basis. We're not sure the software ever will be considered swift, but there are some settings you can adjust in order to reduce load times and overall responsiveness.

Reduce the number of devices iTunes searches for as it starts up. For instance, if you don't have an Apple TV (and most of you don't), click Edit and Preferences and find the Apple TV tab. Make sure that the "Look For Apple TV" box is unchecked. This eliminates just one more fruitless scan of your home network for a device that doesn't exist. By the way, if you are one of the few who has an Apple TV, consider checking the "Prevent Apple TV From Synching Automatically" box. A properly configured Apple TV on your home network should be able to access just about all of the iTunes content (TV, music, movies) on your main PC so long as iTunes itself is left running on your Desktop. Having the two libraries fully synced forces iTunes to keep Apple TV current with your PC and can require a lot of unnecessary hard drive and network activity.

Next, if you aren't sharing your iTunes library with another PC on your network, go into the Sharing tab in the Preferences window mentioned above and uncheck both boxes, "Look For Shared Libraries" and "Share My Library On My Local Network." Again, these activities can slow both program responsiveness and network speed as they do their work in the background.



To avoid distorted audio, ensure that your system has only one equalizer enabled.

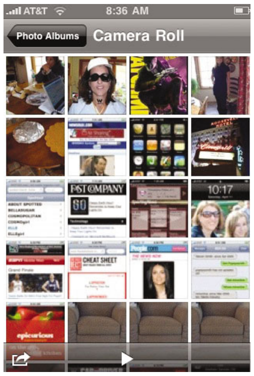
Now, try deleting smart playlists. Many of us think that smart playlists are one of the best features of iTunes. They automate the process of building a playlist without the tedium of manually crafting every song in every list. But many users say that smart playlists are also responsible for much of iTunes' sluggishness. If you can live without them or rarely use the ones you have, then delete them from iTunes and restart. You should see a difference. Take note that disabling smart playlists may not deliver better performance for all iTunes users; try before you buy.

Finally, try turning off the Genius. The iTunes Genius can be a great tool for recommending new tunes that align with your taste and building playlists. But it also does some of its work by consulting Apple's database of tracks along with others' tastes in order to make these judgments. If you don't use Genius, then you *might* accelerate the program by turning it off. Keep in mind that this will also turn any existing Genius playlists into standard playlists. Go to the Store menu and click Turn Off Genius to disable it.

Streamline iPhone Backups

iPhone users have long complained that iTunes takes an inexplicably long time to back up their devices. According to Apple, the Camera Roll is one of the chief culprits when it comes to syncing slowdowns, and that problem is made even worse with the addition of video on the new iPhone 3G S. If you want to keep the images you take with the iPhone, you can make backups faster by moving those images out of the Camera Roll section and into the iPhone's Photo Library.

To do this, connect the iPhone to your PC and open Windows Photo Gallery in Vista. Use the Import from Scanner Or Camera command in the File menu. Select your iPhone and click Import. The Scanner And Camera Import box will identify the number of images it finds on your iPhone and ask for a tag. Then, click the Options link. The next preferences screen lets you toggle on Always Erase From Camera After Importing. Activate this box and begin the import.



If your iPhone backups are incredibly slow, then an overloaded Camera Roll folder may be the culprit.

In our experience, The Windows image copying routines aren't always reliable. Double-check your iPhone to make sure that its Camera Roll has been emptied; sometimes you need to clean up the Camera Roll manually. Once you have removed your images from the Camera Roll, put them in a folder that you want iTunes to keep synced with your iPhone. Highlight your iPhone in iTunes and go to its Photo tab. Use the drop-down menu to select Choose Folder and target the folder with your imported images. Click Sync, and all of the images will be copied to your iPhone, but the backup process won't have to struggle backing up the Camera Roll.

Clashing Equalizers

If your music sounds heavily synthesized or suffers from an unnaturally heavy bass line, you may have two equalizers working on top of one another. If you have an add-in sound card, such as a Creative's X-Fi, or sophisticated onboard sound suite, check its software to see if an equalizer is already on. The iTunes equalizer is located in the Edit menu. If you are experiencing distorted audio or breakups on the high end of the audio scale, make sure that the Preamp setting in the equalizer is not set too high. The Preamp slider is one way to add overall volume to playback, but it comes at the price of distortion.

Another little-known equalizer trick lets you apply settings to specific tracks. In your iTunes library, right-click the bar of category titles (Name, Time, Artist, etc.) and check the option for Equalizer to add a new column to the file list. Next to any song, click the icon in the Equalizer column, and the resulting pop-up can apply any preset to that song whenever it plays.

You can also amplify a given track. Right-click the track to find the Get Info selection. In the Options tab, you will find the Equalizer presets again as well as a volume adjuster that will amplify or diminish the volume only when that track is played. Like the Preamp setting, apply this effect judiciously, as it can add distortion on the high end.

Portable Genius

When you first enable Genius in iTunes, Apple delivers several mixes made out of your library. Our library, for instance, produced five different rock music mixes and one soundtrack mix. If you like the "Genius Mixes" that iTunes makes for your desktop experience, then why not bring them with you? Genius Mixes are transferable to your iPod, but you need to enable them. Highlight your connected iPod. Under the Music tab, go into the Playlists and check one or all of the mixes. Use this with care, however. The Genius can craft some enormous playlists that could easily fill smaller iPods.

Reorganize & Conquer

Until now, iTunes media folders were a mess. There were no distinctions among media types, which made it hard to drill into these directories to find what you needed. A new feature that Apple didn't publicize when it released iTunes 9 lets you reorganize the file structure for storing iTunes media. Click File>Library>Organize Library to open a dialog box that invites you to toggle on Upgrade To iTunes Media Organization. Now your TV shows, movies, and music will show up in separately named subfolders on your hard drive. ▲

by Steve Smith

Windows Tip Of The Month

Vista's Windows Photo Gallery is a versatile built-in photo editor, but it can tax your storage limits. By default, the editor saves the original version of any image you edit. This can be handy when you need to revert an image to the original, but the program puts no limits on how long it holds that original. In order to save space, click File and Options. In the General tab, find the "Move Originals To Recycle Bin After . . . " item and change it from Never to a definitive length of time that best fits your editing style.

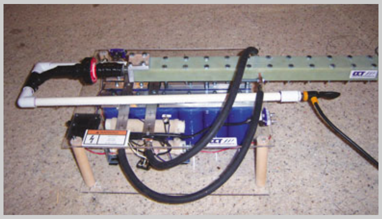
Registry Tip Of The Month

Back it up. We've said it before and we'll say it again: Before making any of the Registry tweaks we suggest here, you should back up the key you are modifying before making a change. Highlight the key and use the File menu in Regedit to click Export. In the next window, name the .reg file with a descriptive name to a safe place. If your tweak goes awry, you should be able to double-click this .reg file, and it will automatically import the original state of the key back into the Registry.

Infinite Loop

Build Your Own (Working!) Railgun

Think of this as "Mod Project: Extreme Edition." A Colorado gentleman has not only constructed a working railgun but also was kind enough to post a video, as well as his work log (tinyurl.com/lncxmy), online. This has to be one of the coolest DIY projects we've seen in a while, but please, kids, this is not a license to carry out your aspirations of hosting a real-life Quake 2 deathmatch.



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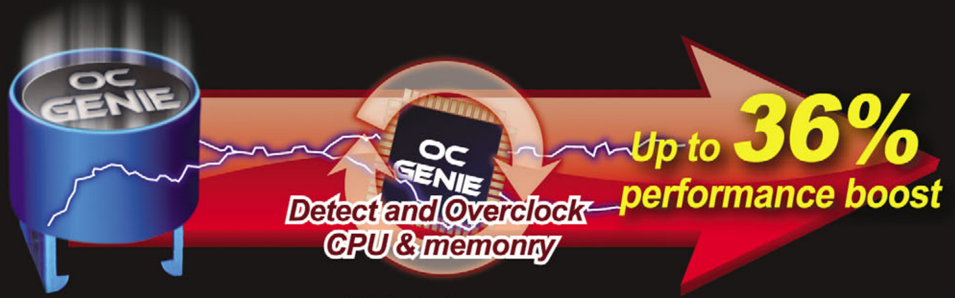
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Warm Up To Penguins

Advanced Video Editing With Kino

Last month, we covered Avidemux, a tool that makes it easy to do some very specific and targeted things to video files. But where do you go if you want a bit more, not professional video editing, but more advanced features? And how can you capture content from your video camera to your system for editing? Both of these questions can be answered with the video-editing program Kino.

Kino (www.kinodv.org) is designed as an advanced consumer video-editing package that does more than Avidemux but less than commercial packages. This doesn't imply that Linux doesn't have high-end video-editing packages. It's just that Kino is just on the edge of consumer-level video editing without going too far into the professional arena.

Kino is known formally as a nonlinear editing program, which basically means it lets you access any part of the video file. The vast majority of video-editing programs used nowadays, whether they're free or commercial, are nonlinear editing programs.

Moving Around Kino

When you first run Kino, its unique interface may seem a little confusing. Other video-editing programs present you with a preview window where you can jump to different parts of a video file. You can select all or part of the file and do whatever you want with that selection. If you select an entire file and apply an effect to it, the effect is applied to the whole file. You can then position all or parts of the video files onto a timeline to create your completed material.

Kino's entire interface centers around the Storyboard panel on the left, which is made up of various scenes. The storyboard is essentially the completed timeline, and the scenes are different video clips that make up the whole movie. Although editing functions can be performed on specific timeframes, by default they're restricted to a particular scene. Because scene management is so important, it's not surprising that most of Kino's toolbar lets you copy, cut, paste, merge, and split scenes.

If this seems like an odd way of doing video editing, think of it as a throwback to the earlier days of linear editing systems. The storyboard is the final tape output, and the scenes are different clips that will be committed to tape. You can move scenes in and out of the storyboard and even drag the scenes around to reposition them.

Kino's Bag Of Tricks

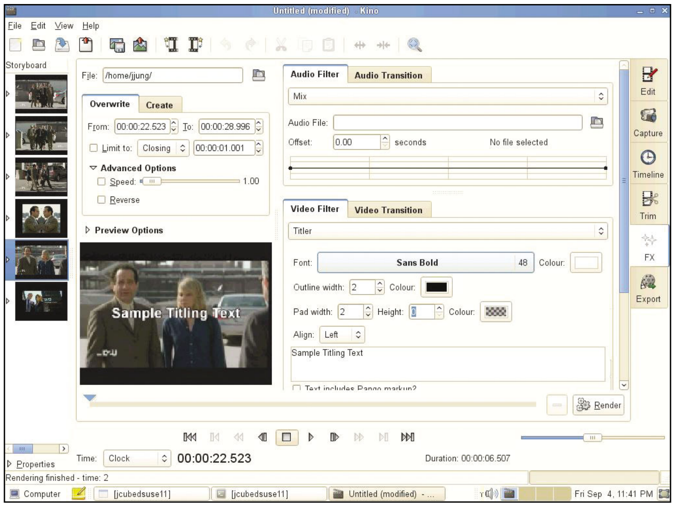
On the right-hand side of Kino's interface is a set of tabs that represent the heart of its capabilities. When you click a particular tab, you're given the options applicable for that particular tool. By default, each tool will limit its operations to the currently selected scene. So if you want to perform some operation on a portion of a scene, consider breaking the scene up into multiple scenes. If you don't want to do that, be sure to specify the exact starting and ending time when you go into a tool.

Kino gives you two tools to go to different parts of the video you're editing. The first is the Edit tool, which sits atop the other tabs on the right. This gives you a slider for the overall position of the entire file you're editing. As you drag the slider around, the different parts of the video will show up in the middle. This tool is most helpful in finding the various scenes you want to use. So, if you're editing your kid's soccer game, you'll want to use this tool to find the highlights of the game. You can then create a scene for each highlight you want to keep.

Another useful tool for moving around your video is the Timeline tab. This tool will show a series of snapshots at different intervals for a selected scene. Depending on the length of a scene, the intervals can be from a few seconds to minutes. When you click a particular point of time in the scene, you're taken immediately to that point in the scene. This makes it easy for you to locate the specific parts of a particular scene that you may want to use.

If your system has an IEEE 1394 connector, you can transfer video footage directly from your camcorder. Just connect the camcorder to your system and click the Capture tab; the video from the camcorder will appear. Use the camcorder's controls to find the footage you want and then use Kino's Record button to capture it.

While you're editing your video, you'll probably find that you have too much footage. That's where the Trim tab in Kino comes in. You use this option to keep the parts of the video



File: /home/jjung/

From: 00:00:22.523 To: 00:00:28.996

☐ Limit to: Closing 00:00:01.001

☐ Speed: 1.00

☐ Reverse

Mix

Audio File:

Offset: 0.00 seconds No file selected

Titler

Font: Sans Bold 48 Colour:

Outline width: 2 Colour:

Pad width: 2 Height: 0 Colour:

Align: Left

Sample Titling Text

☐ Text includes Pango markup?

Time: Clock 00:00:22.523

Duration: 00:00:06.507

Rendering finished - time: 2

Kino gives you plenty of video-editing options, plus the ability to pull video directly from a camcorder.

that you want to keep, and there are two ways of keeping your desired footage. When you open the Trim tab, you can mark off the In and Out points of the clip you want to keep. When using the Overwrite mode, when you click the Apply button, the part of the video that you've selected will replace the scene it came from. When you use the Insert mode, you can add a new scene by clicking Before or After in relation to the current scene. That new scene will be a copy of the portion of the video that you've selected.

But the fun part of Kino can be found in the FX tab, which lets you apply audio and/or video effects. For audio effects, you can apply fade in, fade out, and silence. You can also mix in external sound files. The video effects are pretty standard fare, including the usual flip, mirror, blur, fade in, fade out, and pixilation effects. You can use audio or video effects together or separately. If you want to apply multiple effects, configure and render the first effect, then configure and apply the second one.

One of the more interesting effects you can use is Titler, which lets you overlay text on top of your video. This is useful for all sorts of video files, including opening title sequences, ending credits, labeling important points of the video, etc. Pick the font face, size, color, and horizontal alignment of the text and then enter your text. Best of all, this effect lets you specify the starting and ending positions of the text on the video. If the start and end points are the same, then the text will stay in one place. But if you specify different starting and ending points, then the text will move around the scene. The movement is admittedly linear, so if you want text to bounce around, you'll have to use lots of small scenes.

Once you've arranged scenes and applied effects, it's time to use the Export tab to create the final result. You can output your project in a native DV file format common to camcorders; various flavors of AVI with different compression methods; and, if you have the mjpegtools software suite installed, MPEG, suitable for burning to DVD.

Drawbacks Of Kino

Although Kino is adequate for basic users, as well as prosumers in some cases, it does have some drawbacks. One of the biggest is its limited support for different video codecs. It can natively handle the DV format found in many camcorders, but other formats must be converted. Kino will do the conversion when it imports the particular file, but this can take some time and definitely uses up disk space.

As we've mentioned, Kino does provide basics for audio and video effects. And that's the problem, because the effects are only the basics. Nobody's expecting Kino to go toe-to-toe with professional-grade video-editing software. But in some areas, it also lags behind competing consumer-level video-editing packages on other platforms. Although what Kino does is certainly impressive for a free program, it's clearly a consumer-oriented program.

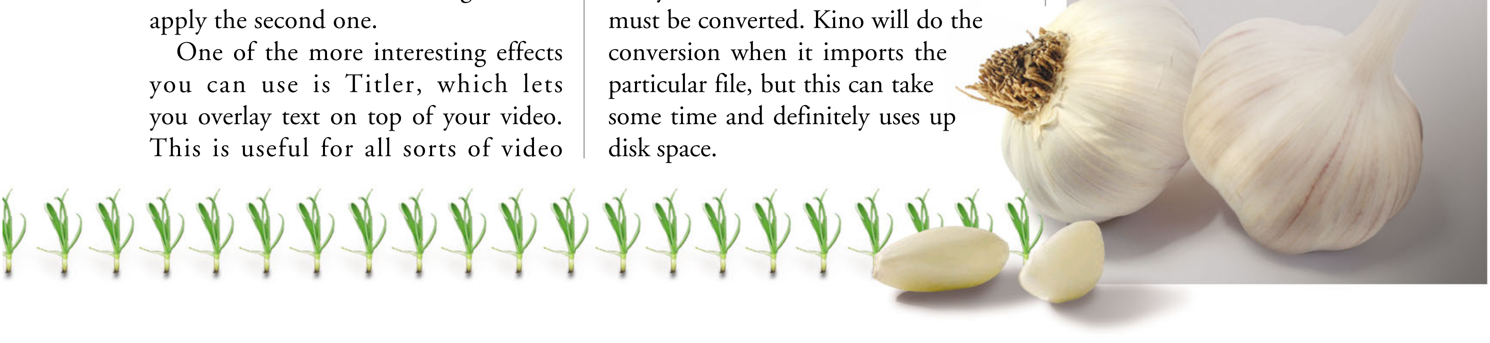
Still, despite its shortcomings, Kino will find a place in your software library. After all, it's one of the few Linux programs that can capture video directly from your camcorder. Many other open-source video-editing packages will let you edit already-captured content, but few will let you capture new content. ▲

by John Jung

Infinite Loop

High-Speed Wireless Internet Creates Mutant Garlic

The latest case from the Tinfoil Hat Files comes to you from Victoria Harbour, Nova Scotia, where a garlic farmer has persuaded the Kings County Council to halt construction of a high-speed Internet tower near his farm. Lenny Levine, who clearly isn't convinced by the fact that the tower's emitted radiation is 60,000 times below the government's limit, says of the tower: "I view it with dread, fear, and panic. I don't want to grow food under those conditions."



Source: www.cbc.ca/technology/story/2009/09/16/ns-internet-tower.html by Mike Magee

The Road Ahead For Intel

I'm writing this from the Intel Developer Forum, held in late September in San Francisco, and Intel is telling us all about its future microprocessor plans. So far, all the news is good (aside from one thing that we'll get to in a moment).

First, Intel is clearly streets ahead of its competitor AMD in process technology. It is beginning to migrate its CPUs to a 32-nanometer process, and it's even talking confidently of the next move to 22-nanometer technology, which is scheduled to happen in late 2011.

What does a move to 32 nanometers give Intel? Of course, the shrink of the die always means that a chipmaker is able to produce smaller microprocessors, and the economy of scale means that we'll have thinner and lighter machines to play with once the cost of the chips falls a bit.

We're really quite amazed at the ease with which Intel continues to migrate process technology according to Moore's Law, and yes, of course, at some point in the future, the process size is going to hit the wall of atomic physics. But we're pretty sure the company still has some tricks up its sleeve for when that day finally arrives.

It's easy to talk glibly of 32 nanometers as if it's just a number, but a nanometer is one billionth of a meter. As Intel said to me a few years ago, a billion of anything is a lot. It was talking about money then. A fab costs over $2 billion to build, and by any standards, that's a lot of money.

Intel talked quite revealingly about its plans to move to a 22-nanometer process technology and also disclosed that not only would it build microprocessors on this technology, but would simultaneously create SoC (system on a chip) devices, too.

The successor to the Nehalem technology is called Sandy Bridge, but prior to that, Intel will produce four-core Nehalem chips for desktops and then notebooks—using 32nm process technology. By the time you read this, the company will have shipped Nehalem EX, a four-socket system with an astonishing eight cores, supporting 54 threads and that will support up to one terabyte of memory.

It's already started sampling Larrabee discrete graphics boards to its customers but was extremely chary in talking too much about this topic. As we wrote in another of these columns earlier this year, Intel will face some pretty stiff competition from both ATI (AMD) and Nvidia, and not just in terms of the technology, although I'm sure it will face challenges there. But Intel will also have to build business partnerships with add-in board companies, and at this point, they are pretty entrenched with the competition.

And while we're on the subject of graphics, Intel has said that it will be able to migrate integrated graphics into the CPU, something the company has been talking about since 1990. It will be able to do that because the impending die shrink will give it access to plenty of transistors for large caches and multiple cores as well as some chipset functions.

If you're wondering what's in store for netbooks, know that Intel is clearly committed long-term to producing iterations of its Atom CPU and doesn't seem to be at all worried that these cheap chips will dent its profitability. Senior VP Sean Maloney told me that at first, Intel had thought that netbooks using these chips would appeal to developing countries, but that isn't how it's panned out at all. Instead, U.S. and Western European consumers are buying them as supplementary machines that they can tote around in their handbags and glad rags. The only area that has been dented, said Maloney, is the lower end of the Celeron market, and Intel doesn't make much money on those processors, anyway.

So what else is happening here? AMD's civil case against Intel starts in spring 2010, and if the jury finds in favour of the former, the damages are likely to be between $9 billion and $10 billion. Intel is very liquid, but that would be a severe blow to its fortunes. Like we said, a billion of everything is a lot of zeroes. ▲

Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

Send rumours to "Mad Mike" Magee at mike@cpumag.com

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Technically Speaking

An Interview With DisplayMate Technologies' Ray Soneira

Dr. Raymond Soneira is the founder, president, and CEO of DisplayMate Technologies. He has a Ph.D. in physics from Princeton University, where he spent five years as a long-term member of the Institute for Advanced Study. He has authored more than 35 research articles in scientific journals on physics and computer science.

by Barry Brenesal

CPU: LED-backlit LCD TVs are being pumped up heavily in the press as the holy grail of entertainment centers. Several companies are out front stating that each of them will produce the LED unit that will take over the field. Right now, LED sets account for 3% or less of the market, but that's due to change drastically. Can we get an overview of what these HDTVs are like?

Soneira: They're currently the most exciting thing that's happening with large-screen displays, and without question, LEDs are the backlight technology of the future. But there is one very important thing to take into account: it's that the LEDs are just the backlight. In principle, a well-designed, well-engineered, well-manufactured, and well-calibrated LED-backlit television is going to be virtually indistinguishable from its equivalent fluorescent-backlight cousin. There are some things that LED backlights can do that fluorescents can't, but from a typical consumer's visual perspective, you're not going to notice a difference. One of the principal reasons for this is that there are really very few TVs that are perfectly designed, engineered, manufactured, and calibrated. There is often a large gap between what a technology can do and what is actually delivered to the marketplace.

CPU: What sort of things can LED backlights do that the fluorescents can't? If I go out and spend $5,000 on an LED-backlit TV, what am I going to get from it that spending $1,500 or less on another TV with a different technology won't deliver?

Soneira: Operationally, if you were to sit in front of a well-manufactured LED-backlit TV and a well-manufactured traditional CCFL (cold-cathode fluorescent lamp)-backlit TV, you wouldn't be able to tell the difference. There are a whole bunch of really interesting technology issues, but from a practical visual perspective, they don't make a noticeable difference. The marketers are, of course, having a heyday with it, and consumers get involved in the excitement. Some people must have the latest and greatest.

One of the most prominently hyped things about LED TVs is that they are noticeably thinner than their counterparts with fluorescent tubes. Typically, there are roughly a dozen lamps arranged horizontally behind the LCD panel. A light diffuser assembly captures all the light that's given off by the lamps, which are not that different in principle from the ones you have in your home, although those are hot cathode rather than cold cathode. But in an HDTV, something that's a few inches thinner in your living room doesn't really make a whole lot of difference.

CPU: Edge-lit screens are being hyped today, as well, aren't they?

Soneira: They're thinner yet. The idea is that instead of mounting all the lights behind the LCD panel throughout the back of the unit—which is the way fluorescent lamps work—they put the lighting just around the outer edges. That's what really lets you reduce the thickness of the TV. All you have are a bunch of LEDs on the periphery, increasing the width a little bit while dramatically shrinking its thickness.

CPU: How do edge-lit televisions stack up for viewing, based on those you've seen and tested?

Soneira: If you look at all the reviews, none of them have been happy with edge-lit units, and that is my experience, as well. It's even difficult to get the lighting to appear uniform on small mobile displays, like cell phones and MP3 players that employ edge-lit technology. But there are many compromises in mobile displays, while in HDTVs the expectations are substantially higher—as you'd expect when you spend several thousand dollars.

CPU: So is the edge-lit television ready yet for general home-entertainment viewing?

Soneira: Right now, it's primarily a marketing gimmick for HDTVs. If you really need to bring your friends over to show them how thin your TV is, that's fine. You're deriving satisfaction from that. But in terms of functional picture quality, they're not yet as good as the traditional backlit TVs.

There's a second flavor of LED backlighting where, instead of putting all the LEDs on the periphery, they're laid out uniformly throughout the back of the TV. Those screens, which can have a thousand or more LEDs inside, are still thinner than their fluorescent counterparts but nowhere near as thin as the edge-lits, and they have much better screen uniformity.

The visual impact of response time and motion smear in live video is significantly overblown. —Ray Soneira

Most LED backlights use white LEDs, which are actually just blue LEDs with an internal yellow phosphor. Some high-end LED backlights use separate red, green, and blue LEDs arranged in triads. This is a really useful and exciting enhancement that allows the white point chromaticity and color temperature to be accurately adjusted so that the LCD panel can operate at its optimum signal drive settings. Properly implemented, this can produce a noticeable improvement in picture quality and accuracy. So, two thumbs up for RGB LED backlights that are properly calibrated. But that's a very big "if," by the way. . . .

CPU: Local dimming, like the edge-lit screen, is being talked up right now as the road to entertainment perfection. Care to explain that one?

Soneira: Sure. First, to get there, let me tell you one thing LEDs can do that fluorescents can't: They can be turned on and off in microseconds, so they can be dimmed very quickly and accurately using PWM (pulse width modulation). With dynamic backlighting, the brightness of the LEDs can be changed for every video frame based on the instantaneous picture content. So, for example, in dark scenes, the backlight can be dimmed in order to produce darker blacks.

LEDs can also be strobed very quickly to reduce motion blur. The problem is that the liquid-crystal fluid can't move quickly enough to follow image differences from frame to frame. If the backlight is kept on all of the time, the viewer is going to see all of the intermediate fluid states between any two frames. This will accentuate smearing. What's great about LEDs is that you can turn them off during those intermediate periods when the fluid is moving between frames.

CPU: But as someone who regularly tests new screen technologies, what's your impression of motion blur and response time?

Soneira: The visual impact of response time and motion smear in live video is significantly overblown. As a result, it's being used as a marketing gimmick by the manufacturers. This is done by artificially reducing the response time specifications and by increasing the screen refresh rates to 120Hz or more. While it's possible to see differences with special DisplayMate motion test patterns, in careful side-by-side comparison tests with live-action video, none of the 30 panelists that participated in our recent Display Technology Shoot-Out could detect a difference in motion blur among the 12 side-by-side HDTVs showing identical content. The reason is that live-action video generally has so much going on that the eye doesn't notice the blurred regions of the images. In essentially all cases, whenever motion smear was visually detected, it was in the source video.

CPU: In all our discussion, we've lost track of local dimming.

Soneira: Right, local dimming is the most advanced current implementation of LED backlighting. We've covered LEDs turning on and off quickly, dimming, and strobing the entire TV screen. But the next step is local dimming, where you divide the screen up into 150 or more independent zones. The idea is that if the content in a particular area of the screen isn't very bright, instead of keeping the backlight constant and forcing the LCD panel to bear the brunt of decreasing the intensity in that area, it dims the local backlight and lets that region of the panel run at the optimum portion of its operating range. The primary advantage of local dimming is that it delivers a darker black level in the darker regions of the picture. High black levels are a major problem for LCDs because their true native contrast ratio is only about 1,500:1. In principle, this sounds like a great idea, but in practice, the patchwork of zones is frequently noticeable in darker pictures, and it produces objectionable halos around brighter objects. So you're trading one artifact, a high black level, for a whole bunch of grayscale artifacts, which in my opinion are a lot worse.

Because each of the local zones needs independent real-time image analysis, processing and control is a lot more complicated and expensive than fullscreen LED backlighting. It currently adds $1,000 or more to the price tag, but in my opinion, the overall picture quality is actually better without this expensive feature.

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Subscribers can read bonus content with Ray Soneira
www.cpumag.com/cpudec09/soneira

by Anastasia Poland

Under Development

A Peek At What's Brewing In The Laboratory

Lunar Love Not Eclipsed By Digital Renderings

Despite technological leaps in astronomy, there still remains a bit of myth and magic around the beauty of lunar eclipses.

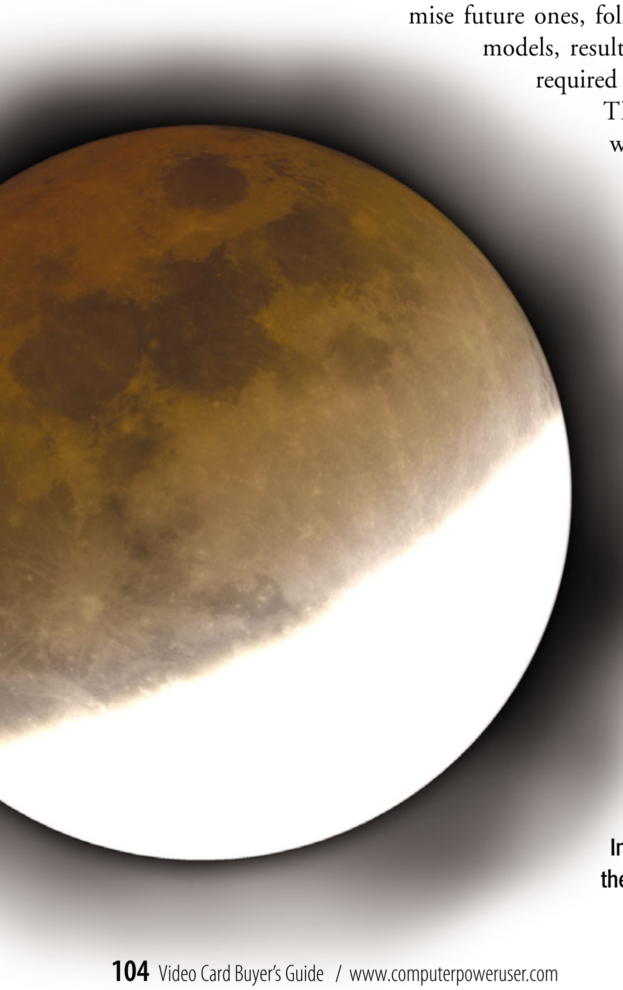
Researchers led by Ted Yapo and Barbara Cutler at Rensselaer Polytechnic Institute are in no way undercutting that magic with a new software program that can accurately render lunar eclipses from the past as well as the future. If nothing else, the results of their innovative work only heighten our fascination with our nearest neighboring satellite.

Yapo explains how lunar eclipses work: "Lunar eclipses are visible because our atmosphere bends light rays from the Sun into the otherwise dark shadow of the Earth. Along this path, shorter wavelengths (i.e. blue light) are preferentially scattered out. The predominantly red and orange wavelengths that remain bathe the Moon in a coppery glow."

He also relates that the software simulates "the light paths and scattering processes in the Earth's atmosphere using a variant of the ray-tracing algorithm more commonly used to render realistic-looking virtual scenes." The rendered model can be adjusted to accommodate any viewing point on the earth.

Seems simple, but the sticky wicket is in gauging everything from the variability of atmospheric junk ("density, temperature, and mixture of gasses and particulates comprising our atmosphere," according to Yapo) to how the moon's surface reflects back to a viewer. This is where the team has to dive into literature to research past atmospheric conditions and to surmise future ones, followed by extensive experimentation with models, resulting in a search for "all the physical data required to accurately model the effects involved."

The team has been happy with the software's performance, as their models' accuracy and clarity have been remarkable even in some glitches. Yapo explains, "At one point, we accidentally mistyped a date and rendered the moon a month later than the intended eclipse. The result was an accurate rendering of the moon for exactly that time and date; we had inadvertently created a moon appearance simulator instead of just an eclipse simulator. We were pleased to see that the subtle reddening of the full moon when it appears near the horizon is faithfully reproduced by our model." ▲



Lunar eclipses modeled by innovative rendering software created by researchers at Rensselaer Polytechnic Institute are virtually indistinguishable from the photos of the real thing.

E-Business Gets a Hand With Contractual Obligations

As any flourishing e-business knows, you have to have efficient systems, a seamless customer interface, rock-solid contractual agreements, and a secure back-end or you'll soon hear the slam of your virtual doors closing. A European consortium, called CONTRACT (www.ist-contract.org) and funded by the European Union, has been working on an entire set of e-business tools to ease the way contracts are done online; essentially, a software suite will routinely validate and oversee contractual agreements.

The team was challenged to find contractual language that could fulfill a broad set of business needs while being easy for programmers to code, says CONTRACT project coordinator Javier Vázquez-Salceda of the Universitat Politècnica de Catalunya in Barcelona. It took extensive research working with experts in both the legal and artificial intelligence fields to get the definitions and language needed, at least from a theoretical perspective.

One of CONTRACT's success stories is its verification algorithms that cross-check a business' existing contracts against impending ones to make sure there are no conflicts in obligations or impediments to fulfillment. In addition, the team's work is also considered breakthrough because if the system finds issue with a contract, it can execute a new one, cancel it altogether, or shelve it until it can be reviewed. ▲

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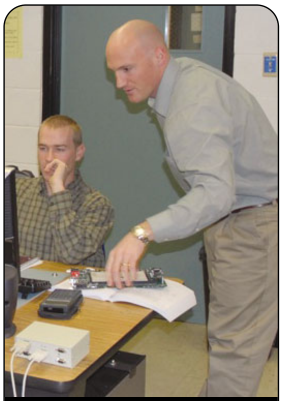
Log-On Labs: MSU Pilots Online Engineering Classes

Montana is known for its incredible wide-open spaces, which are excellent fodder for photogs, visitors, and ranchers but a helluva commute for dedicated college students. With student-requested distance learning in mind, Montana State University in Bozeman recently began building a pilot program for engineering students that includes courses utilizing a Web-based laboratory that students can access from home.

With a $148,000 grant from the National Science Foundation, computer engineering assistant professor Brock LaMeres will be initially purchasing four to eight logic analyzers—devices that will let remote users view and manipulate data as it is transferred from processor to memory. Students will be able to use the analyzers online with special Web-based software that will also be provided by LaMeres' team. What the researchers look to find out is how well students perform using the logic analyzers onsite vs. using them remotely.

As far as how many students can be served by the program, LaMeres explains, "Our initial prototype lab setup consists of four remote stations. Typical lab exercises for an engineering course average two hours per week throughout the semester, so in a given week, we could potentially give access to five students per station per day, for a total of 100 students per semester. Our project is going to target a subset of students for the pilot offering in which 16 students will use the equipment."

That said, if all 16 of their digital lab stations were equipped to run the remote offerings, MSU's engineering labs could provide access "to as many as 400 students per semester."


Montana State University's Dr. Brock LaMeres assists a student in person at the Tektronix Digital Systems Lab. LaMeres is heading up a pilot program that will allow engineering students to access lab equipment and courses via home computers.

Still in the beginning phase of the two-year grant, LaMeres says they are now facing the challenge of "accurately measuring our student's current level of understanding of our selected course outcomes."

For the future, however, the team hopes to integrate both their approach to infrastructure building and learning assessments "into more courses and build partnerships with other campuses to pilot a broader deployment of the techniques." LaMeres is hoping that other colleges and high schools will eventually benefit from his team's research and findings.

Audio Developers Can Finally Tune Into What Matters

As the commercial once said, "This isn't your father's Oldsmobile." And it for sure isn't your dad's thumpin' audio system inside. However, existing car audio certainly can still stand for some improvements in quality (as can sound systems in videoconferences, movie theaters, and concert arenas). A group of European researchers involved in the hArtes (Holistic Approach to Reconfigurable real Time Embedded Systems) project are on top of fostering those improvements by working on a set of backend software tools that will, in theory, advance audio technology.

CarLab, part of the hArtes project, is the place where new audio sound system applications get a run for their money.

Part of the current issue is in combining embedded systems with multiprocessor architectures. Basically, the embedded systems (such as an MP3 player) are very specific in their functionality but need to communicate with other more general systems with broad, multiple functionalities. The more embedded systems, processors, programming languages, hardware, and software applications involved, the more complex and time-consuming it is for a developer to bring everything together.

The hArtes Project has been creating a toolchain of "mainly software . . . a development environment accelerating the development of applications," says Roberto Marega, hArtes' project manager. "As the toolchain simplifies the code development, with an automatic code partitioning and mapping, developers can focus on the algorithms of their audio applications." In other words, the hArtes toolchain provides the translations needed for all the systems to understand each other clearly and play nicely together and allows audio application developers to concentrate on creating software that rocks.

The hArtes team has been testing out their compendium of tools in a real-world environment called CarLab. Using a Mercedes R320 CDi V6, loaded with approximately 24 mics, 30 speakers, and a bunch of top-end amps, has been the "classroom" for the researchers studying what degrades the listening experience in a car. Road noise, wind, car materials used inside the car, passengers, and even the shape of the interior of the car have been considered as the team developed their software improvements accordingly.

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CPU

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10.23.09

Intel LanFest - Orlando, FL
lanfest.intel.com
Intel LANFest New Mexico - Rio Rancho, NM
lanfest.intel.com
LAN OC v5.0 - Ohio City, OH
lanoc.org
Maryland LAN Gamers - Greenbelt, MD
www.marylandlangamers.net
Necronomicon - St. Petersburg, FL
www.seads.org/LANParty/lanparty.htm
NTBI 6th Annual FragFest - Waukesha, WI
www.newtribesbibleinstitute.org
R-Dot LAN - Regina, Saskatchewan, Canada
www.r-dot.org
Ubercon XII - Piscataway, NJ
ubercon.com

10.24.09

Bellingham LAN - Bellingham, WA
www.bellinghamlan.com
Carolina Armageddon - North Carolina
www.carolinagaming.com
Game Renegades Child's Play Charity - Ames, IA
www.stuorg.iastate.edu/gr
HyperGamez Halloween LAN - Fort Worth, TX
www.thetexangamer.com
KC Beatdown - Overland Park, KS
www.kcbeatdown.com
Krosswirz - Quincy, IL
www.krosswirz.net
Protocol 42 - West Jordan, UT
www.protocol42.com
Pwnapalooza 7 LAN - Wichita Falls, TX
pwnapalooza.com
WVG Gamers - Eugene, OR
www.wvgamers.com

10.30.09

The GXL 768 - Millville, NJ
www.thegxl.com
UAT LAN Party - Tempe, AZ
www.facebook.com/group.php?gid=2202744525

10.31.09

Lannage 10 - Peoria, AZ
www.lannage.com
NCGC LAN Party - Grovetown, NH
www.electronicesthetics.com/lanparty
Peace, Love, and Rockets - Keller, TX
www.peaceloveandrockets.org

11.06.09

PDXLAN 14.5 - Portland, OR
www.pdxlan.net

11.07.09

Ghetto LAN party 30 - Denton, TX
www.ghettolanparty.com
LANManiac - Brea, CA
www.lanmaniac.com
TechLAn - Montgomery, WV
www.lanville.org

11.13.09

BaseLAN - Winnipeg, Manitoba, Canada
www.allyourbaseonline.com
Big Shot Gaming LAN Party - Mount Pleasant, MI
www.bigshotgaming.com
FnT4 - Wayne City, IL
www.myspace.com/fraggtagg
FredX - Fredericton, NB, Canada
www.FredX.ca
Mason ACM LAN Party - Mason, OH
www.masonacm.org
Nerdacon v4 - Columbus, GA
www.nerdacon.moonfruit.com
TusLAN - Tucson, AZ
www.tuslan.net

11.14.09

Arctic LAN 3.0 - Wasilla, AK
arcticlan.com
CapLAN - North Vancouver, BC, Canada
caplan-bc.com
CS 1.6 5v5 CAL Rules Tournament - Seattle, WA
www.gameclucks.com
GDG LAN - Tyngsboro, MA
www.gdg.uml.edu/lan
IUCGC LANWAR 17 - Bloomington, IN
812-340-3940
LAN Lordz - Wichita, KS
www.lanlordz.net
PNP LAN - Largo, FL
www.pnplan.com
SLAGG - Sarasota, FL
www.slagg.org

11.15.09

Whempy's LAN Party - Columbus, OH
whempyslan.org

11.20.09

Intel LAN Fest Infernal LAN - DuPont, WA
lanfest.intel.com
Super Gaming Center - Neptune Beach, FL
sgamingcenter.com
ZonaCon - Orlando, FL
www.seads.org/LANParty/lanparty.htm

11.21.09

JaniCon - Jacksonville, FL
www.seads.org/LANParty/janicon.htm
NGC's LAN-A-GEDDON - Greenville, TX
www.networkgamingclub.com
Nifty-Nerd LAN Party - Akron, OH
www.nerdika.com
Oklahoma Gamers Group - Oklahoma City, OK
www.okgg.org
WVG Gamers - Eugene, OR
www.wvgamers.com

11.25.09

Krosswirz - Quincy, IL
www.krosswirz.net
SUNYIT Gamers Club - Utica, NY
stgc.yuku.com/topic/17

11.28.09

KC Beatdown - Overland Park, KS
www.kcbeatdown.com
NCGC LAN Party - Grovetown, NH
www.electronicesthetics.com/lanparty

12.05.09

ACR LAN - Bakersfield, CA
alexandercomputerrepair.freeforums.org/lan-f3.html
LANManiac - Brea, CA
www.lanmaniac.com
PC-Gamers.net Frag-Fest - Fishersville, VA
www.pcgn.net
PNP LAN - Largo, FL
www.pnplan.com

12.12.09

HiramLAN '09 - Hiram, OH
hiramlan.co.cc
LAN Lordz - Wichita, KS
www.lanlordz.net
SLAGG - Sarasota, FL
www.slagg.org

12.19.09

NGC's LAN-A-GEDDON - Greenville, TX
www.networkgamingclub.com
Oklahoma Gamers Group - Oklahoma City, OK
www.okgg.org

12.20.09

Super Gaming Center - Neptune Beach, FL
sgamingcenter.com

12.30.09

Krosswirz - Quincy, IL
www.krosswirz.net

January 2010

BamaLAN - Tuscaloosa, AL
bamalan.com/index.html
LanWar - Louisville, KY
www.lanwar.com

01.02.10

LANManiac - Brea, CA
www.lanmaniac.com

01.15.10

Kansas LAN - Lyons, KS
www.kansaslan.com
PDXLAN 15 - Portland, OR
www.pdxlan.net

01.16.10

Midwest LAN - Darien, WI
www.midwestlan.com
NGC's LAN-A-GEDDON - Greenville, TX
www.networkgamingclub.com
Oklahoma Gamers Group - Oklahoma City, OK
www.okgg.org
WVG Gamers - Eugene, OR
www.wvgamers.com

01.17.10

Whempy's LAN Party - Columbus, OH
whempyslan.org

01.22.10

Lannihilation - Calgary, Alberta, Canada
www.lannihilation.ca

February 2010

Bellingham LAN - Bellingham, WA
www.bellinghamlan.com
Netwar 17.0 - Omaha, NE
www.netwar.org

02.06.10

Carolina Games Summit - North Carolina
www.CarolinaGamesSummit.com
LANManiac - Brea, CA
www.lanmaniac.com

02.19.10

AWOL LAN - Wisconsin
www.awollan.com
CryoLAN - Buffalo, NY
www.cryolanparty.com

02.20.10

WVG Gamers - Eugene, OR
www.wvgamers.com

02.26.10

Fites 250 Man Lan - New Holland, PA

March 2010

Madicon LAN Party - Harrisonburg, VA
www.madicon.org

03.01.10

Madicon LAN Party - Harrisonburg, VA
www.madicon.org

03.05.10

Digital Overload - Providence, RI
www.digital-overload.com

03.06.10

LANManiac - Brea, CA
www.lanmaniac.com

03.13.10

CapLAN - North Vancouver, BC, Canada
caplan-bc.com

03.20.10

WVG Gamers - Eugene, OR
www.wvgamers.com

04.03.10

LANManiac - Brea, CA
www.lanmaniac.com

04.17.10

WVG Gamers - Eugene, OR
www.wvgamers.com

05.01.10

LANManiac - Brea, CA
www.lanmaniac.com

06.05.10

LANManiac - Brea, CA
www.lanmaniac.com

06.26.10

Meno Falls LAN - Pewaukee, WI
www.menofallslan.com

07.01.10

ClanUSEast 2010 - Laughlintown, PA
www.clanuseast.com

December 2010

Overkill LAN Party - Tampa, FL
www.overkill-lan.com

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Q&A With Randy Pitchford

At The Borderlands Of Gaming With Gearbox's CEO

To anyone who loves gaming, Randy Pitchford leads a charmed life. At age 38, he is the president, CEO, and co-founder of Gearbox Software and creator of multiple Half-Life titles, Halo: Combat Evolved for PC, the Brothers in Arms series, and the forthcoming Borderlands. A talk with Pitchford exposes not only some of the game industry's inner workings but also where the gaming industry is headed.

Q **You've said before that Borderlands has over half a million weapons. Tell us about the engine used to generate that amount of variety.**

RP When we first announced the game, we announced that we had developed a system to procedurally generate weapons. At that point, the system had produced over half a million. Today, the number is over 16 million. There are more guns in Borderlands than in every game ever released on the Xbox 360 and PlayStation 3 combined. It happened because we created an artificial intelligence that created the weapons for us. We invented all these manufacturers in the science-fiction world that all had different styles and promises they were making to their virtual customers. Then we fed the system a huge volume of materials: plastic, vinyl, composites, metals, carbon fiber, wood—even alien material. We fed [it] what each thing looks like, what the properties are, how those things work with other materials, and then we fed it the definitions for all the different types.

Once we turned this thing on, it was able to produce tens of thousands of combinations in a matter of seconds. It's pretty awesome stuff because it did surprising things we didn't expect. Like what if a bullet didn't fire just a solid piece of metal? What if it fired a capsule that had acid in it so that when it hit a guy, it just melted his face off? That kind of stuff.

Q **That's amazing, but is there a point where you go over the edge, and all of this becomes gratuitous and harmful either to the user or to the game itself?**

RP There are a couple of factors that tell us that. One, what is the intent? What are the reasons why this violence exists? Two, how is it depicted? If you've looked at the style in Borderlands, obviously there's blood, but there's something about the rendering of the world that's a lot more like when the Wile E. Coyote's traps backfire on him than, say, watching somebody's body get gypped into paste during "Saving Private Ryan."

Borderlands is about fun. Yeah, you're gonna melt people's faces off with acid, but it's like when Wile E. blows himself up with TNT, and there's almost a matchstick version of him left behind. You laugh and move on. As long as any human capable of manipulating a joystick develops a sense between fantasy and reality, he's going to know that he's very clearly in the realm of fantasy.

Q **Gaming from the cloud would sure seem to fix a lot of piracy concerns. If for no other reason than that, is cloud computing the future of gaming?**

RP I don't know if it's cloud computing. But I do think piracy can be dealt with while simultaneously creating a more convenient customer experience. In the future, we'll probably be buying a credential, like a token—a code on a little USB key or something equivalent—associated with an account. What's neat about this is that your account can go with you. So if you were to use somebody else's Xbox, you'd log in with your account and have access to everything that you have purchased a credential for.

The other neat thing about this is credentials will support the secondary market. Currently, when you sell a used game, you get pennies on the dollar, but the creators are cut out. It's technically illegal, but no one's actually ever fought it. It's really become a big problem. But with the credential, you'll buy the credential and, if you're done with it, you can take it back to the store and sell it. When they resell it, they'll have to unlock that credential. The act of unlocking creates an opportunity for everybody involved to get a piece of the unlocking. It's as easy as swiping a credit card.

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